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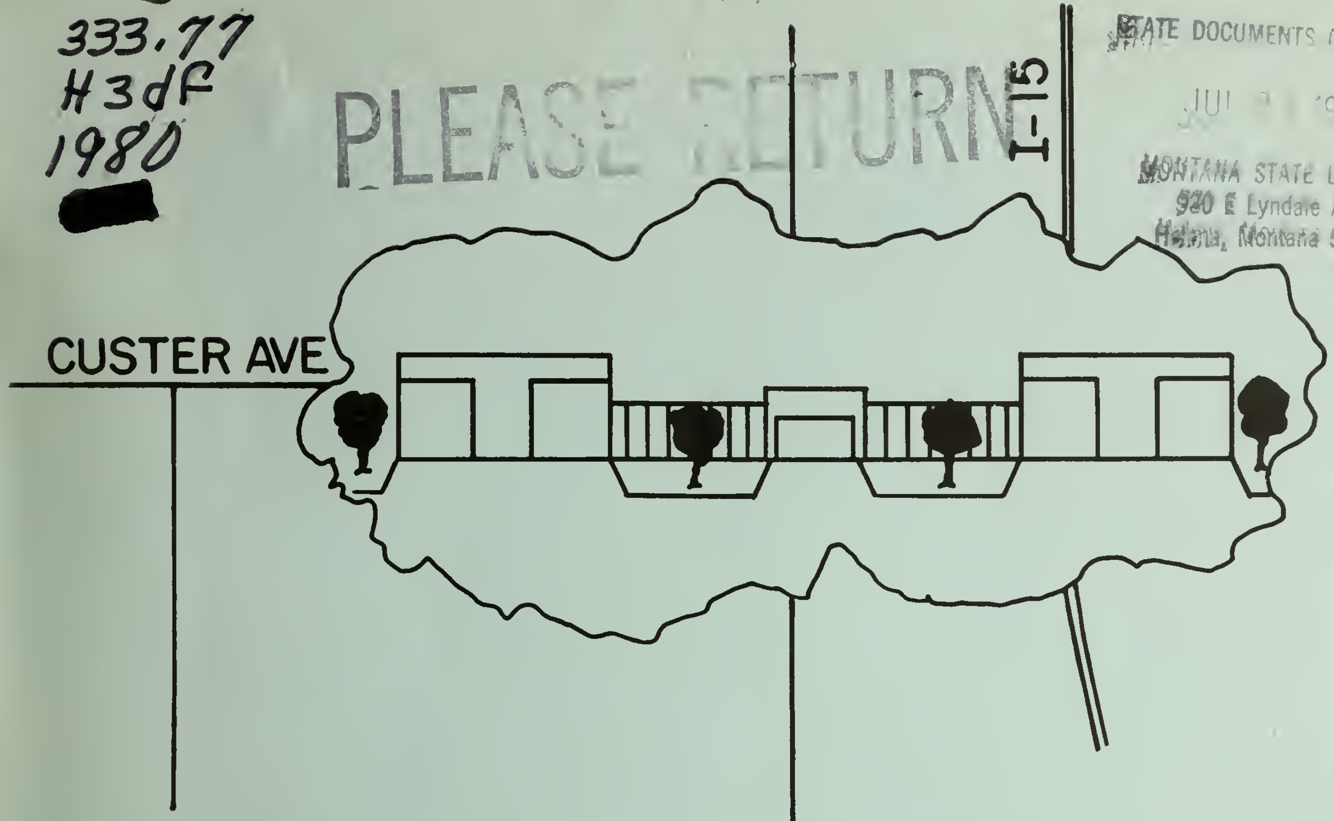

FRONTIER MALL

draft environmental impact statement

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Draft Environmental Impact Statement

Frontier Mall Shopping Center

Prepared by the Montana Department of Highways
Pursuant to the Montana Environmental Policy Act
April, 1980

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SUMMARY

Draft Environmental Impact Statement

Frontier Mall Shopping Center

This environmental impact statement (EIS) describes the environmental impacts of the proposed Frontier Mall shopping center in Helena, Montana. The Montana Department of Highways is the lead agency responsible for the EIS; this draft document was written by the Montana Department of State Lands under contract to the Department of Highways.

The following summary of environmental impacts is based on the more detailed discussion in chapter III of the draft EIS.

Description of the proposal:

Developers Diversified plans to build a shopping mall at the northeast corner of North Montana Avenue and Custer Avenue in Helena, Montana. The mall would be on a 71-acre parcel recently annexed to the City of Helena. The mall, parking area, and landscaped area would occupy about 43 acres. The mall would have 334,500 ft^2 of gross leasable area, including three department stores and a number of smaller stores. The mall would employ the equivalent of about 440 full-time workers and would cost about $14 million. Completion of the mall is projected for fall, 1981.

The City of Helena has annexed the mall site, zoned it to allow commercial development, and granted a conditional use permit to allow the development of a shopping mall. The city has required 16 conditions of the developers in its conditional use permit; those conditions are included generally in this analysis.

Action being considered and alternatives:

Before the mall could be built the Montana Department of Highways would have to approve the necessary highway access permit.

Possible alternatives available to the Department of Highways include rejection of the access permit, which would prevent construction of the mall as proposed; additional improvements to the local street system beyond the minimum required; and modification of the developer's plan for hauling fill across North Montana Avenue. If the permit were denied, the developer could choose alternative uses of the mall site. The developer may also propose a different commercial use for the site if the mall access permit were denied. Any action leading to significantly greater traffic movements than now exist would require application for access.

Additional mitigating measures which would reduce projected impacts from the mall are discussed in the following summary of impacts.

Summary of adverse impacts:

- Frontier Mall would continue the trend toward commercial development along Custer Avenue and North Montana Avenue near their intersection. The mall would not induce scattered "leapfrog" development along those routes owing to the limited land available. Additional adjacent development could be avoided if the city and the county were to adopt restrictive land use policies for the mall vicinity.

- The mall would capture about 40 percent of the projected market for comparison goods in the Helena area, mostly through a redistribution of sales from existing businesses to Frontier Mall, but partly by capturing sales now lost to other cities. Businesses relocating to the mall are projected to leave about 60,000 to 80,000 square feet of vacant space in Helena's existing retail centers. The impact probably could not be avoided.

- Services directly and indirectly required as a result of Frontier Mall would cost the City of Helena as much as $25,000 more per year than it would receive in revenues. This would have the effect of raising the city levy about 1 mill or reducing the service level. The method used to calculate costs probably yields a high estimate, particularly for the sanitation department (see fig. III-2). There would be an additional cost to the city of about $52,000 to reimburse the developer for the difference in cost of installing the required 12-inch water main and installing a standard 8-inch water main. This cost would have to be paid within 10 years.

- Frontier Mall would create an immediate need for major improvements to the Custer Avenue-Montana Avenue intersection about 5 years earlier than if the mall were not built. The impact could not be avoided. During construction of the mall, gravel trucks hauling fill across Montana Avenue would periodically disrupt traffic. This impact probably could be avoided only by hauling the fill with an overhead conveyor belt. Access to the mall would be inconvenient for pedestrians and bicyclists unless walkways, bicycle lanes, and signals were provided on the nearby streets.

- The anticipated increase in gasoline consumption due to local shopping trips to the mall is expected to be entirely offset by a reduction in shopping trips to other cities.

- A net total of about 330 new full time jobs would be created by the mall. This would increase Helena's projected 1990 population by about 1 percent. The resulting impact on Helena's community services would be minor.

- No adverse effects on cultural, historical, or archeological resources are expected.

- Frontier Mall would have a minor esthetic impact: the mall site is not esthetically significant compared to other undeveloped lands near Helena, and the mall would probably be more visually pleasing than most of the existing commercial development along North Montana Avenue.

- Vehicle trips to the mall would add 1-2 percent to pollutant emissions in the Helena Valley. No adverse effects on human health are expected from this increase. Fugitive dust would temporarily increase during construction of the mall; dust emissions could be halved if an effective watering program were implemented.

- Noise during construction of the mall would occasionally disturb people working inside nearby buildings; after construction, noise from the mall would not interfere with nearby indoor or outdoor activity. Limiting construction to normal working hours would minimize noise problems.

- Although the probability of a major earthquake during the life of the mall is difficult to predict, the risk to occupants of the mall during such an earthquake suggests that a mall design in excess of minimum standards should be considered.

- No significant erosion problems are anticipated. Ground water would not be affected. Surface water quality would be protected through use of a sedimentation pond.

Primary, secondary, and cumulative impacts:

The primary impacts include the physical changes at the mall site and a redistribution of retail trade. Detailed discussion is found in chapter III, sections on Retail Trade, Community Services and Financing, Cultural Resources, Esthetics, Climate, Air Quality, Noise, Geology, Hydrology, Soils and Vegetation, and Wildlife. Secondary impacts include changes in nearby land uses, traffic to and from the mall, and the effects of increased population. Detailed discussion is found in chapter III, sections on Land Use, Transportation, Employment and Income, Sociology, Recreation, Climate, Air Quality, and Noise.

Growth-inducing effects:

Frontier Mall would induce little population growth in the Helena area. The primary effect would be a change in the location of commercial growth patterns: Helena's existing shopping areas would grow more slowly, while the trend toward growth along North Montana Avenue and Custer Avenue near the mall site would be encouraged. Residential growth patterns are not expected to be noticeably affected.

Irreversible and irretrievable commitments of resources:

The mall site would be committed to commercial use for an indefinite period. Because the soil would be removed it would be difficult to restore the land to agricultural use. The mall building would use about 2.3 million kilowatt-hours of electricity and at most 126 million cubic feet of natural gas annually; this represents about 0.6 percent of the current electricity use and 2.7 percent of the natural gas use in the Helena urban area. Net gasoline use would not increase because the mall would reduce shopping trips to other cities.

Gravels under the mall site may contain up to 30,000 troy ounces of gold. The gold could not be recovered as long as the mall stands; however, the gold may not be economically recoverable anyway due to its low concentration.

Short term uses versus long term productivity:

The mall site is not now being used for agriculture, but if it were, it could produce about 70 AUM's of forage/year under good management. That potential use--enough to produce about 3500 pounds of beef/year--would be foregone if the mall were built.

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CHAPTER I

DESCRIPTION OF THE PROPOSAL UNDER CONSIDERATION

A. PURPOSE OF AND NEED FOR ACTION

Developers Diversified, an Ohio partnership, plans to build a shopping mall at the northeast corner of Montana Avenue and Custer Avenue in Helena, Montana. The shopping center, called Frontier Mall, would occupy about 71 acres immediately within the current Helena city limits (see fig. I-1).

Frontier Mall would require a highway access permit from the Montana Department of Highways (DOH). The Montana Department of Health and Environmental Sciences (DHES) will review the developer's plans for water supply, sewers, and air quality. The Governor's Office has determined that the pending actions by DOH and DHES require an environmental impact statement (EIS) in compliance with the Montana Environmental Policy Act.

The Montana Department of Highways will base its decision, in part, on the discussion of transportation impacts in this EIS. The Montana Department of Health and Environmental Sciences will base its decision, in part, on the discussion of water and air quality in this EIS. Information on social and economic effects, included in this document to comply with the Montana Environmental Policy Act, may be useful to local government planners.

Section B of this chapter briefly describes the history of the Frontier Mall proposal to date. Section E describes the responsibilties of the various State and local agencies that must review the proposed mall. The Helena City Commission voted on March 10, 1980, to annex the mall site and grant a conditional use permit to allow construction of a shopping mall. The City Zoning Commission has zoned the mall site B-2 (community-highway business) to allow construction of the mall.

B. HISTORY OF THE PROPOSAL

Developers Diversified requested B-2 zoning of the mall site in July, 1978. At that time the developers also announced their intention to request annexation to the city followed by a conditional use permit for a regional shopping center. Before taking final action on the request, the Helena City Commission adopted a 1-year moratorium on approving new shopping centers in Helena except in the downtown area. Developers Diversified withdrew its zoning request and announced plans to build the shopping mall without city services or annexation.

In October, 1978, the Lewis and Clark County Areawide Planning Organization (A.P.O.) asked the State of Montana to prepare an EIS on Frontier Mall, partly because the county had no formal process available to review the developer's full plans and obtain public comment on those plans (Lewis and Clark A.P.O. to Governor Thomas Judge, written commun.,

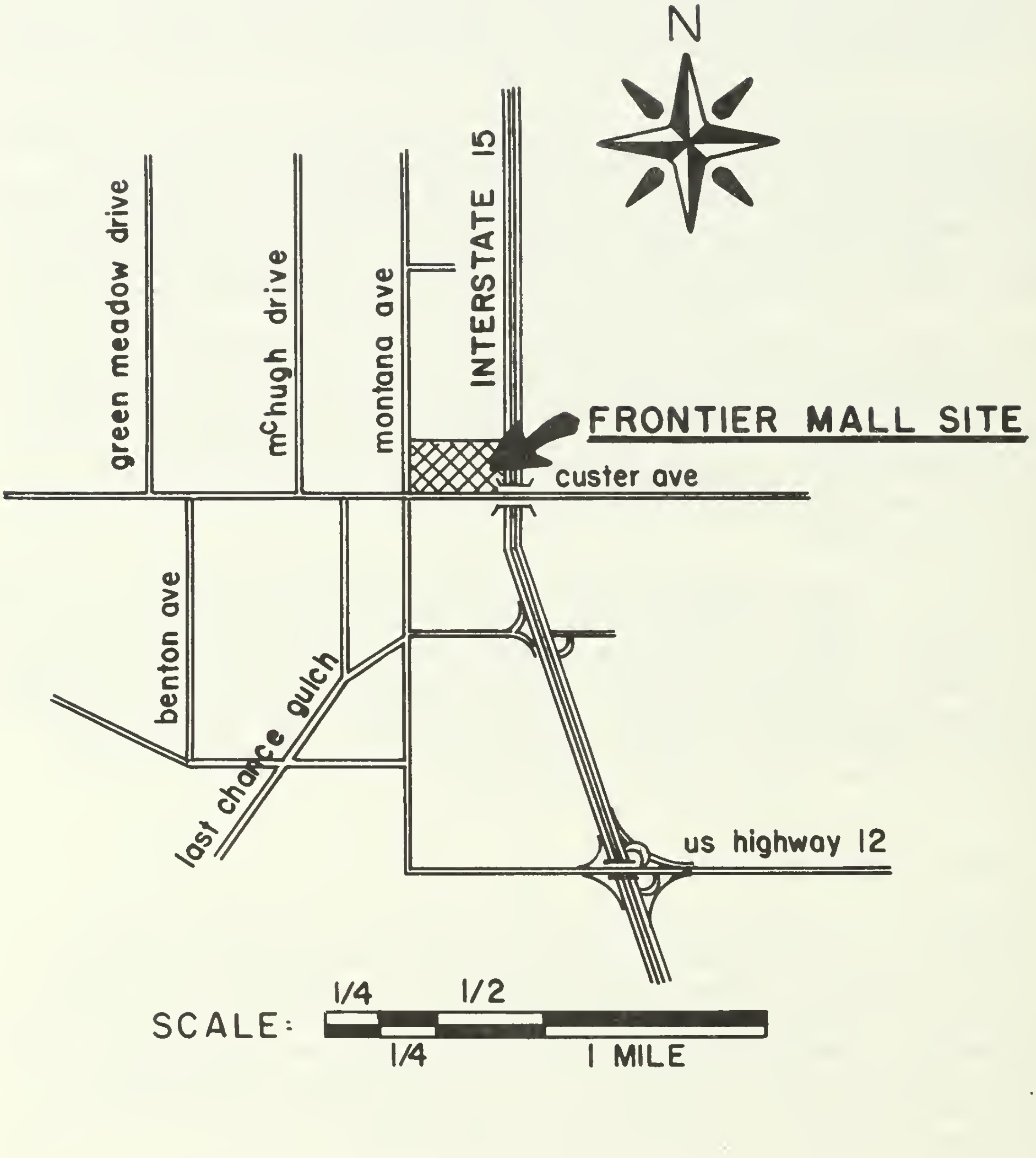

FIGURE I-1.--Location of proposed Frontier Mall.

October 26, 1978). The Montana Department of Highways prepared this EIS because they were the only State agency requiring a permit before development of the mall could begin. The Governor appointed the DOH lead agency to prepare the EIS for the State of Montana. The Department of State Lands wrote the EIS under a contract with the DOH dated October 21, 1979.

As originally organized, this analysis of Frontier Mall examined impacts with and without annexation of the mall to the City of Helena. The Helena City Commission voted to annex the mall site on March 10, 1980. Accordingly, the portion of the EIS analyzing impacts under a no-annexation scenario was deleted. The no-annexation analysis is on file with the Department of Highways and is available for public inspection.

C. DESCRIPTION OF THE PROPOSED MALL

The proposed shopping center would be on a 71.14-acre parcel of land at the corner of Montana Avenue and Custer Avenue (see fig. I-1). The center would extend approximately 1300 feet north of Custer Avenue and east to Interstate 15. The mall, the parking area, and the landscaped area would occupy about 43 acres. Developers Diversified is willing to reserve about 8 acres for a possible interchange to Interstate 15 at the southeast corner of the parcel. About 4 1/2 acres would be used for facilities to channel, retain, and detain storm water runoff. The remaining 15 1/2 acres, primarily those areas facing Montana and Custer Avenues, would be reserved for possible future development.

According to the developer's current plans (fig. I-2), the mall would contain three major department stores. A fourth department store may be built in the future but is not included in the current plans evaluated in this EIS. The proposed site plan shown in figure I-2 may be slightly modified at the request of tenants before final construction.

The total building area would be 383,600 ft^2 and would house 45 to 55 retail stores. The mall would have 334,490 ft^2 total gross leasable area, including 161,700 ft^2 for three separate department stores, 172,250 ft^2 for other retail stores, and 540 ft^2 for mall kiosks. The mall concourse would be 47,310 ft^2 and nonleasable area would be 1,800 ft^2. The parking lots would have space for approximately 2,400 cars at a ratio of 7.2 vehicles/1000 ft^2.

Based on experience at the Developers Diversified malls elsewhere in the nation, about 50 percent of the gross leasable area at Frontier Mall would be in department stores, 15 percent would be in drugs, variety, hardware, gifts, and fabric stores, 14 percent in apparel stores, 5 percent in restaurant and food purchase goods, 4.5 percent in books, amusement, and music stores, 3 percent in shoe stores, 1.5 percent in jewelry stores, and 1 percent in service organizations (banks, hairdressers, etc.). Six percent of the gross leasable area could be expected to be vacant.

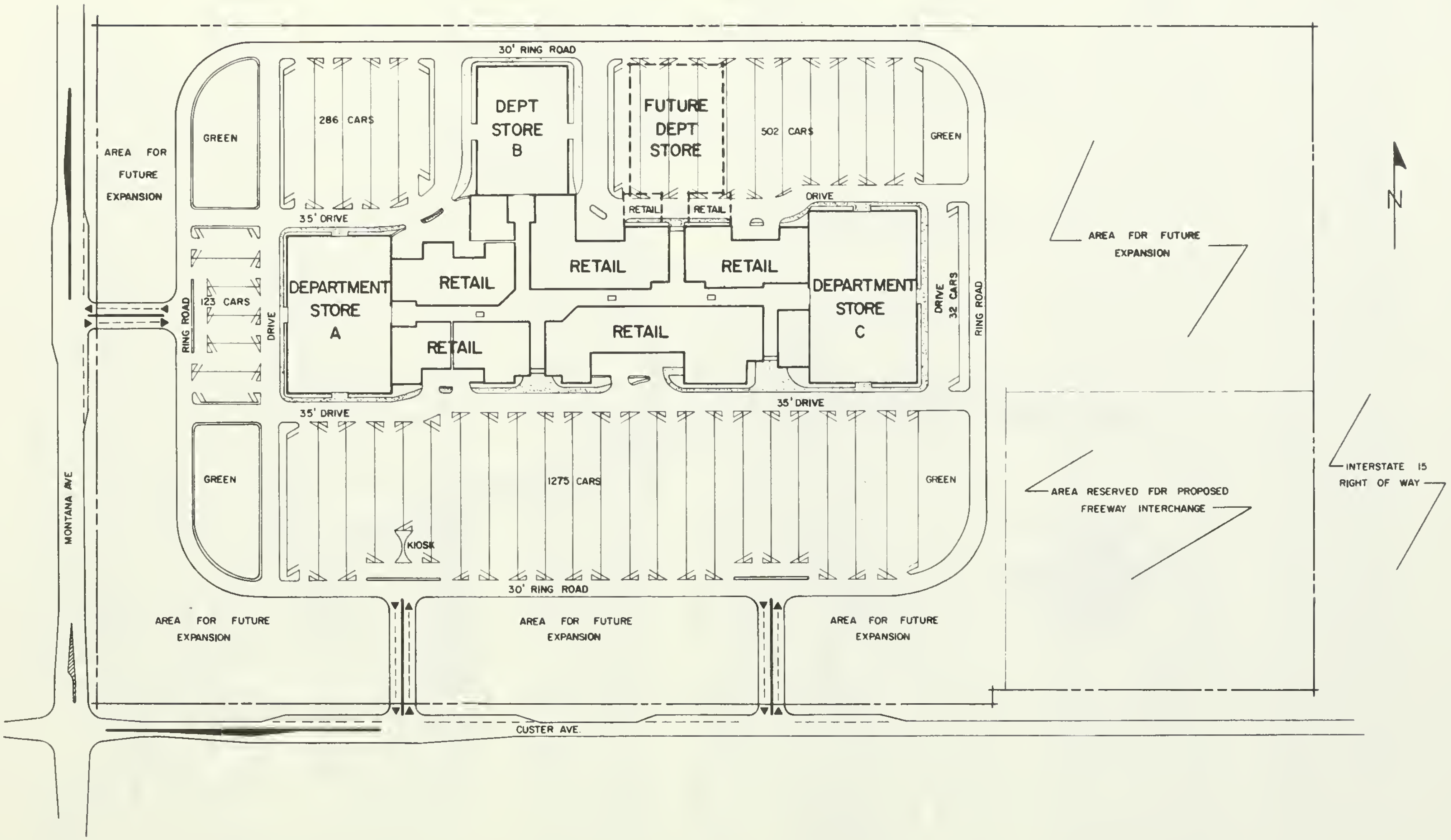

FIGURE I-2.--Frontier Mall site plan.

Vehicle access to the shopping center would be through 3 approaches (see fig. I-2). One approach would be on Montana Avenue about 800 feet north of the Montana-Custer intersection. Two approaches are proposed on Custer Avenue approximately 650 feet and 1,400 feet east of the Custer-Montana intersection. The access approaches would be designed and located according to DOH specifications and would include acceleration and deceleration lanes and left turn storage lanes at all access entrances. The traffic inside the shopping center would be regulated by a ring road.

The mall would employ about 325 people full-time and 230 people part-time. The initial phase of the project as evaluated in this EIS would cost about $14,210,000, according to the developer's estimate.

Construction of the mall is proposed to begin in the spring of 1980 and would be completed by the fall of 1981. At least 20 and as many as 50 people would be directly employed in construction. The project would remove about 73,000 cubic yards of material by grading and would require 384,000 cubic yards of fill. Fill would come from the gravel pit directly west of the site. Traffic on Montana or Custer Avenues would not be stopped or detoured during construction except in emergencies. Dust from the hauling of fill would be abated by oiling the haul routes and by frequent applications of water or other palliative such as oil. The developer's plans for a safe crossing of Montana Avenue requires approval by the Department of Highways before use and appropriate modifications, if warranted, during use of the crossing.

D. REQUIRED SERVICES--CITY AND COUNTY

Because the mall site has been annexed by the City of Helena, the mall would use city services. Chapter III, Community Services and Financing, describes the required facilities and their costs in detail.

The 24-inch city sewer main that runs eastward through the site toward the city sewer treatment plant would be adequate for the center. The city would charge $300/acre to connect to the city's sewer. The developers may have to build a lift station to connect to the city sewer. The mall would require a major extension of a water main from one of two locations near the mall to provide adequate water for fire fighting. The developers would have to provide for adequate storm water drainage in accordance with the city's master plan. The city of Helena would provide police and fire protection and solid waste disposal.

E. REQUIRED PERMITS

1. Montana Department of Highways

The proposed mall requires access to Montana Avenue (State Highway 287) and Custer Avenue. In addition to access, modification of these avenues is proposed to provide for reasonable traffic safety at and near the mall access sites.

The Department requires a Driveway Approach Permit prior to development of the proposed access sites (60-2-20 MCA, 18-2.6 AI (1)-8607 ARM). Approval of the permit will be contingent upon a review of the proposed changes to the existing highway. The department prepared a preliminary review of the requested access permits on June 11, 1979. Information from that review was used in the Transportation sections of this EIS.

Any required highway modifications attributable to the proposed development would be financed by the developer. The approval of the permit is the responsibility of the Department of Highways' Maintenance Division and is not affected by annexation.

As the only state agency with permitting authority, the Department of Highways has the lead responsibility of completing an environmental review and analysis pursuant to the Montana Enviornmental Policy Act (MEPA) and the rules and regulations adopted thereunder to consider the primary, secondary, and cumulative impacts of the proposed development upon the human environment (75-1-101 et seq. MCA). In addition, 18-2.6 AI (1)-S615 (4) ARM of the department's rules provides:

> In cases where the chief of the Field Maintenance Bureau determines that the approach will have a significant effect upon the environment and the Department is the lead agency, the applicant is required to include an Environmental Impact Statement with the approach application.

The reader is referred to the introductory text for a discussion of the development of the EIS process for the proposed Frontier Mall. The developers submitted a parking and traffic study with their application, and are paying for the EIS being prepared by the Department of State Lands.

2. Montana Department of Health and Environmental Sciences

The Department of Health and Environmental Sciences (DHES) has the primary responsibility for air and water pollution control activities in Montana (75-5-101 et. seq. MCA, 75-2-101 et. seq. MCA). The proposed development has no facilities that require review or permit approvals regarding air quality. The development, however, would be subject to compliance with air quality standards during its construction and operation.

Plans by the developer for public water and sewer systems must be submitted to DHES for review and approval. ARM 16-2.14(10)-S14321 provides:

> Before a person commences construction of a new public water or sewer system or a major alteration or extension of an existing public water or sewer system, an engineering report along with necessary plans and specifications for the public water and sewer system shall be submitted to the department for review and approval. For sewer lines, detailed plans and profiles shall be provided.

Annexation does not affect this review and approval process.

3. Lewis and Clark Conservation District

The supervisors of any district have the authority to formulate regulations governing the use of lands within the district in the interest of conserving soil and water resources and preventing and controlling erosion (76-15-701 MCA). The Lewis and Clark County Conservation District, under Ordinance No. 77-01, has required a soil erosion and sediment control plan for the mall construction. The Conservation District granted a permit for the rough grading of the project on November 27, 1978. Before further development begins, the Conservation District will require further updating and approval under that permit. Annexation does not affect this process.

4. Helena City Commission

The Helena City Commission, acting on the recommendation of the Helena Zoning Commission, approved the requests by Developers Diversified for (1) a conditional use permit, (2) B-2 Community-Highway Business District zoning, and (3) annexation of the proposed mall site to the City of Helena. The Zoning Commission recommendations, however, contained 16 conditions for the requested approvals. Those conditions are listed in Appendix A of this EIS.

CHAPTER II

DESCRIPTION OF THE EXISTING ENVIRONMENT

A. LAND USE

1. Frontier Mall Site

a. Current use

The proposed site for Frontier Mall contains two separate parcels of land. The west half is undeveloped open space at present. The Saint Joseph's Orphans' Home occupied the site for over 70 years prior to 1966 when the Montana Power Company purchased the land. The second parcel of 32 acres is adjacent to the first parcel and Custer Avenue. This land is used as a homesite with pasture for two horses.

b. Land use trends near the mall site

In the absence of a major new commercial development at the intersection of North Montana and Custer Avenues, substantial new commercial development along Custer Avenue would not be likely. Although the area west of the intersection has a significant amount of vacant land, mostly on the north side of Custer Avenue (see fig. II-2), it is steadily being converted to medium and low density residential development (Lewis and Clark A.P.O., 1979). Development to the east of the intersection is limited by Interstate 15, the city's sewer treatment plant, and the Helena Airport. The effect adoption of the proposed Airport Noise Compatibility Plan would have on the use of the mall site is discussed in chapter IV, Alternative Uses of the Mall Site.

2. Helena Area

North Montana Avenue and the 11th Avenue-Prospect Avenue couplet join Helena's two largest employment areas, the central business district (CBD) and the Capitol complex, with the three areas of rapid residential development, the East and West Helena Valleys and the southeast corner of the city (see figs. II-1 and II-2). Land along the 11th Avenue-Prospect Avenue couplet and on North Montana Avenue between Helena and Custer Avenues has been almost completely filled in by various types of commercial development. Because of a trend toward denser commercial uses, this latter area will likely become one of the highest concentrations of retail and commercial business activity in Helena (Lewis and Clark A.P.O., 1979). Most of the retail activity along 11th Avenue, Prospect Avenue, and North Montana Avenue depends on highway transportation.

Cedar Street east of its intersection with North Montana has been developed commercially, mostly by low density uses with the K-Mart location being the major exception.

The West Helena Valley has been undergoing rapid residential development and some commercial development. Access is primarily by Montana Avenue; this arterial is showing signs of strain on its ability to handle

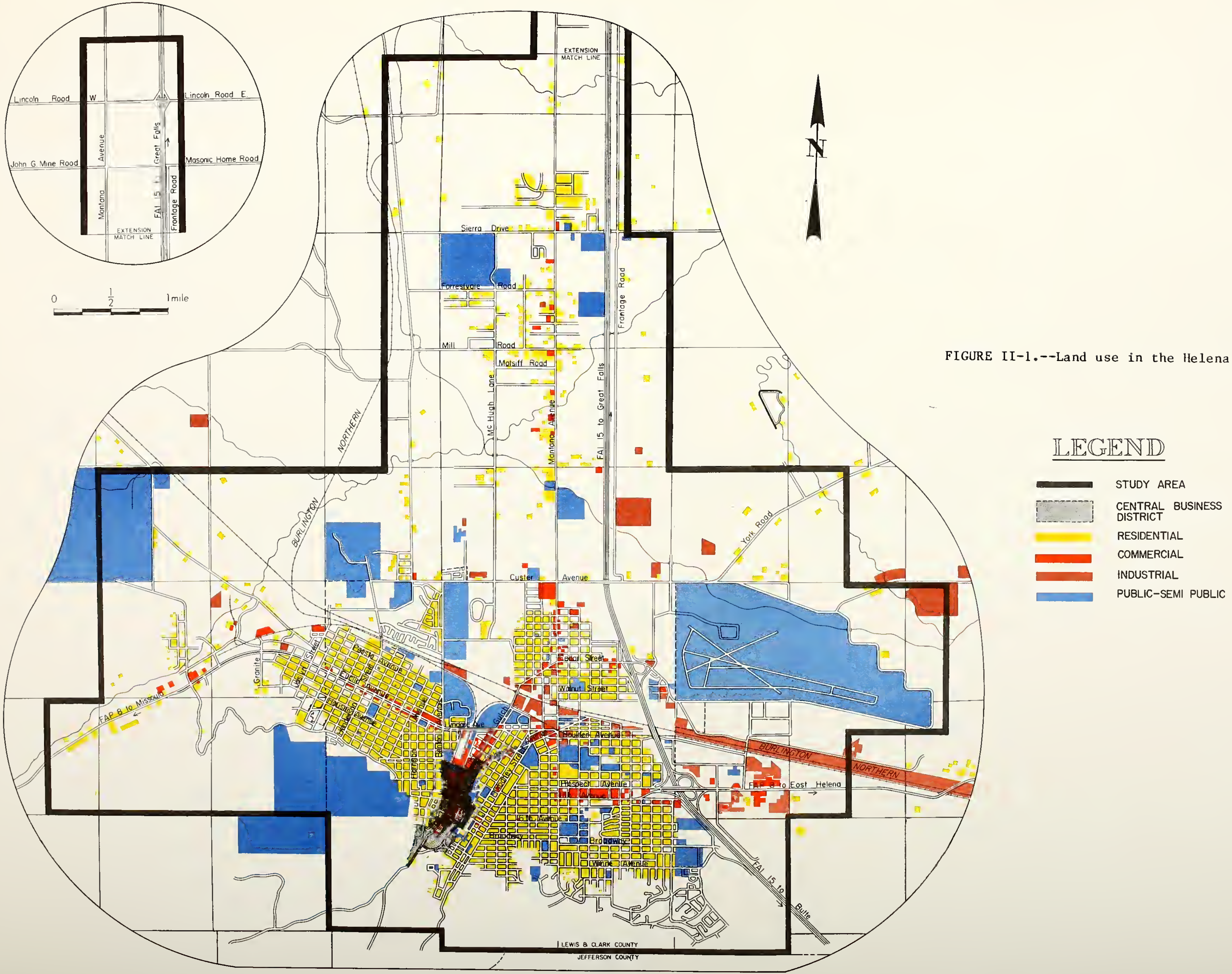

FIGURE II-1.--Land use in the Helena area, 1969.

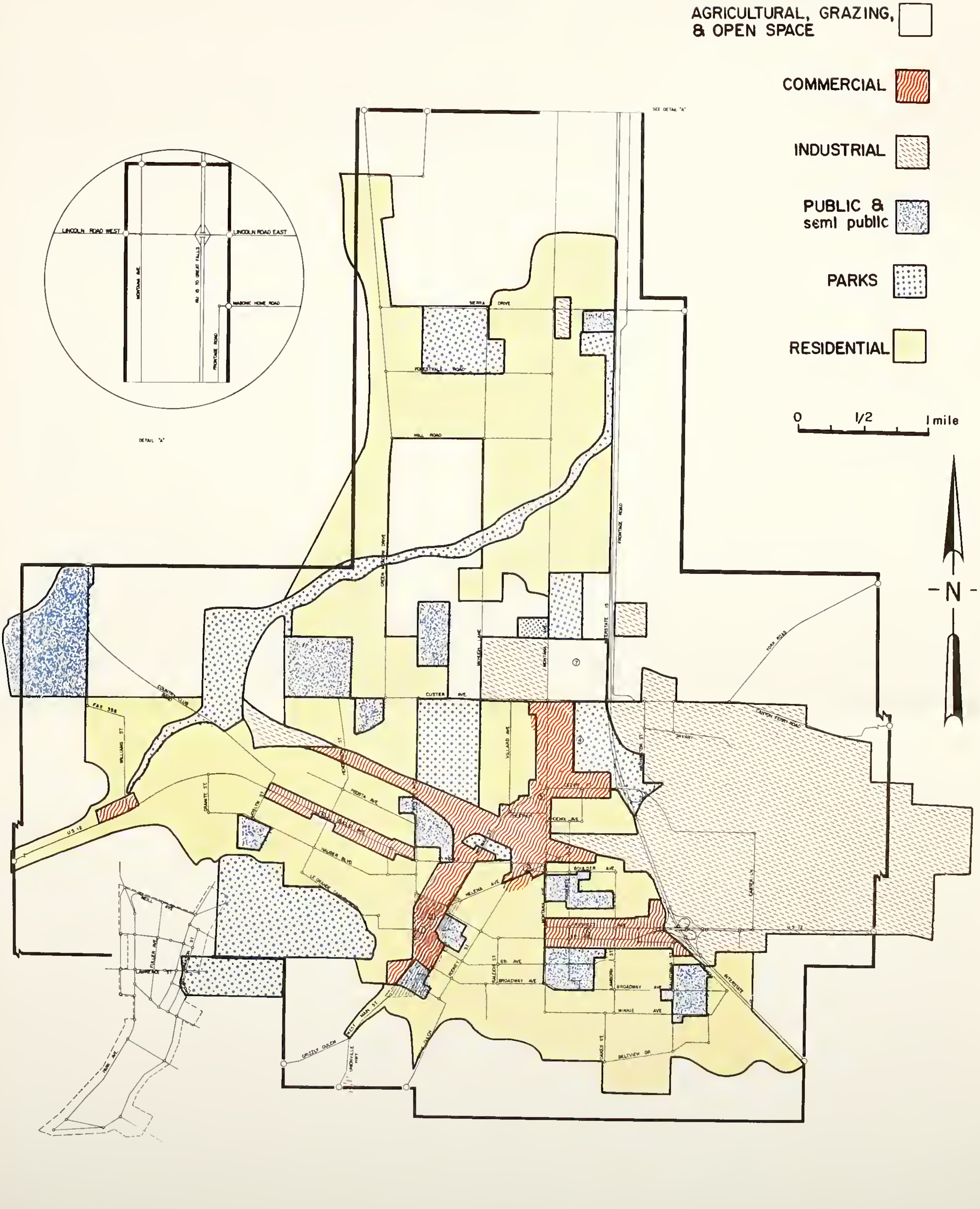

FIGURE II-2.--Generalized land use in the Helena area, 1979. Area coded "parks" includes some park-like open space.

the traffic load. Because most of the area's residents value large lots, a fairly low residential density and a rural atmosphere still exists. Land and construction are more affordable for home builders, particularly since Farmer's Home Administration (FmHA) loans are possible in the area located at least 4.5 miles beyond the city limits.

Between 1970 and 1978 over 126,000 acres in Lewis and Clark County (13.6 percent of the county's total agricultural land) were converted from agricultural to non-agricultural use (Montana State Board of Equalization, 1970; Montana Department of Revenue, 1978). The change represents an annual reduction of about 1.6 percent, more than three times the rate statewide.

The rapid development of the East Helena Valley (particularly the area north of East Helena) and the southeast corner of the city of Helena have both contributed to the intensification of commercial development along the 11th Avenue-Prospect Avenue couplet. This trend will likely continue. Although there is little vacant land available for additional commercial development, several parcels, including Capital Hill mall, could be redeveloped into more dense commercial uses. A major expansion of the Capital Hill mall has been approved by the City of Helena.

Helena's central business district (CBD) is listed on the Natonal Register of Historic Places as the Helena Historic District and is a tourist attraction. The CBD has been changing from Helena's retail core to a financial, office, and specialty center. This change was initiated by retail development in other areas of the city and more recently by the Urban Renewal Program. "Numerous businesses moved from the area during this time and although new and upgraded space later became available, the attraction of a good cross-section of business back to the CBD has been slow" (Lewis and Clark A.P.O., 1979). Downtown is still the business heart of the city primarily because the banking facilities are located there. The area also has many specialty shops and professional offices (Lewis and Clark A.P.O., 1979). In the last two years two large retail stores and about 10 smaller retail stores have moved out of the CBD or have gone out of business. Much of the space vacated by the smaller stores has been reoccupied.

About 400 people work at the Federal Office Building at the south end of the CBD. Other major uses include a motel, county library, a public neighborhood building, and a movie theater. The area still contains one of the greatest concentrations of retail activity in the city. In addition, areas adjoining Last Chance Gulch are the most densely populated residential areas in Helena (Boyer, 1979).

The CBD will probably be promoted primarily as a financial and office center. According to the Lewis and Clark A.P.O. (1979), the area will probably continue to prosper as an economic force.

The highest concentration of dwelling units in Helena is in the east-central area. The next highest concentration is in the southeast area .

followed closely by the upper west side (see fig. II-4 and table II-9). There is some commercial development along Euclid Avenue but extensive further business development is not expected (Lewis and Clark A.P.O., 1979).

B. RETAIL TRADE

Retail sales in Lewis and Clark County increased by 31.3 percent between 1972 and 1977; slightly faster than the average growth (28.9 percent) for urban trade centers within Montana (see table II-1). Per capita sales in the Helena area, however, were slightly less than the urban average even though income in Lewis and Clark County is significantly higher than in most other urban centers. Part of the reason for this lower-than-expected per capita sales level appears to be the greater trade leakages from Helena than is the case for the other urban centers (Western Analysis, 1980). Helena, like other trade centers, receives more trade from outside of the city than it loses to other areas (Great Falls, Missoula, etc.) but proportionately Helena's leakages (losses) still remain higher.

TABLE II-1.--Comparative statistics for urban trade centers in Montana, 1972-1977

[Sources: U.S. Department of Commerce, 1979a; 1979b, 1979d]

Trade Center	1977 Retail Sales (Millions)	Real Growth In Retail Sales, 1972-77 (% Change)	Retail Sales Per Capita 1977	Population 1977	Population % Change 1972-77	Per Capita Income 1977
Lewis and Clark	$172.2	31.3%	$4,360	39,500	13.5	$7,259
Cascade	364.0	17.4%	4,277	85,100	1.1	6,612
Missoula	319.3	29.5%	4,744	67,300	10.9	6,589
Gallatin	177.8	37.8%	4,596	38,700	10.6	5,531
Silver Bow	171.2	11.0%	4,206	40,700	-3.3	6,255
Flathead	196.3	37.5%	4,177	47,000	14.6	6,332
Yellowstone	513.9	37.9%	5,063	101,500	11.5	7,211
Urban Average	273.5	28.9%	4,489	60,000	8.4	6,541
STATE TOTAL	$2,847.5	22.2%	$3,717	766,000	6.7	6,093

In order to more fully understand the dynamics of shopping-related travel, a car license survey was conducted at the downtown area and primary shopping center facility in Butte, Great Falls, Missoula, Helena, and Bozeman from 2:00 to 4:00 p.m. on Saturday, December 1, 1979. A summary of the Helena count is shown in table II-2.

Table II-2 indicates that 21.2 percent of all cars counted in Helena were from outside the area. Of course, not all those cars were in Helena for the purpose of shopping only. Because shopping and recreational trips are expected to be about equally split (Institute of Traffic Engineers, 1976), these data indicate that Helena received approximately 10 percent of its comparison shopping trade from outside the county. Given the leakages from the area (133 cars; 12.8 percent of all Lewis and Clark County cars counted), Helena loses an estimated 6 percent of its comparison shopping trade to external attractions.

Table II-3 provides a comparison of inflow and outflow rates for other cities in the region. As can be seen from the table, Helena loses significantly more trade than the surrounding cities. The most likely reason for this is Helena's location between the other cities, two of which are larger and offer more retail shopping space.

TABLE II-2.--Shopping patterns in the Helena market area

[Source: Western Analysis, 1980]

Flows in to Helena from		Flows out from Helena to	
County	Number of cars	County	Number of cars
Lewis and Clark....	907	Cascade........	65
Jefferson..........	50	Missoula.......	40
Cascade............	30	Butte..........	19
Broadwater.........	18	Bozeman........	9
Gallatin...........	17		
Silver Bow.........	16	Total....	133
Missoula...........	13		
Powell.............	10		
Yellowstone........	9		
Flathead...........	7		
Lake...............	5		
All other..........	69		
Total......	1,151		

TABLE II-3.--Trade flows for comparison shopping goods in major western Montana urban areas in 1979

[Source: Western Analysis, 1980.]

Urban area	Percent in	Percent out	Net flow
Helena-------	10	-6	4
Great Falls--	12	-2	10
Missoula-----	20	-2	18
Bozeman------	10	-2	8
Butte--------	9	-3	6
Average------	12	-3	9

As a result, Helena's market access (relative distance to population centers--Great Falls, Butte, Missoula and Bozeman) is less than half the average for the other primary trade areas within western Montana. In other words, there are relatively more opportunities to shop "elsewhere" than is generally the case. Consequently, trade leakages from Helena are higher, and (for the same reason) the trade area is comparatively small (see fig. II-3).

This does not mean that Helena's shopping facilites are not competitive. Furthermore, it does not mean that large amounts of income are flowing to external regions. Current losses probably amount to less than $3 million (in constant 1977 dollars) per year.

In 1977, the most recent year for which figures are available, total retail sales in Lewis and Clark County amounted to $172.234 million with more than 95 percent of the sales occurring in the city of Helena. Only the portion of those sales which represent comparison shopping goods are appropriate for this analysis. Data on sales by type are not available for the Helena area; consequently, state-level ratios were used to estimate local comparison shopping goods sales. These types of goods expected to be sold at a regional mall include paint, glass, wallpaper, hardware, general merchandise, apparel and accessories, furniture, furnishings and equipment, drugs, florists-cigar stores-news stands, and miscellaneous shopping goods. Purchases of those items represented 27.49 percent of all forms of retail trade within Montana. Applying this percentage to Helena's 1977 total sales figure (95.3 percent of the county's) of $164.14 million produces an estimated total shopping goods sales figure of $45.12 million (Western Analysis, 1980).

Sales figures for 1980 and 1990 were projected by Western Analysis (1980) and are based on county population projections by the Helena Socioeconomic Advisory Committee (Lewis and Clark A.P.O., 1979). After being adjusted for inflation, total sales (in 1977 dollars) in the county

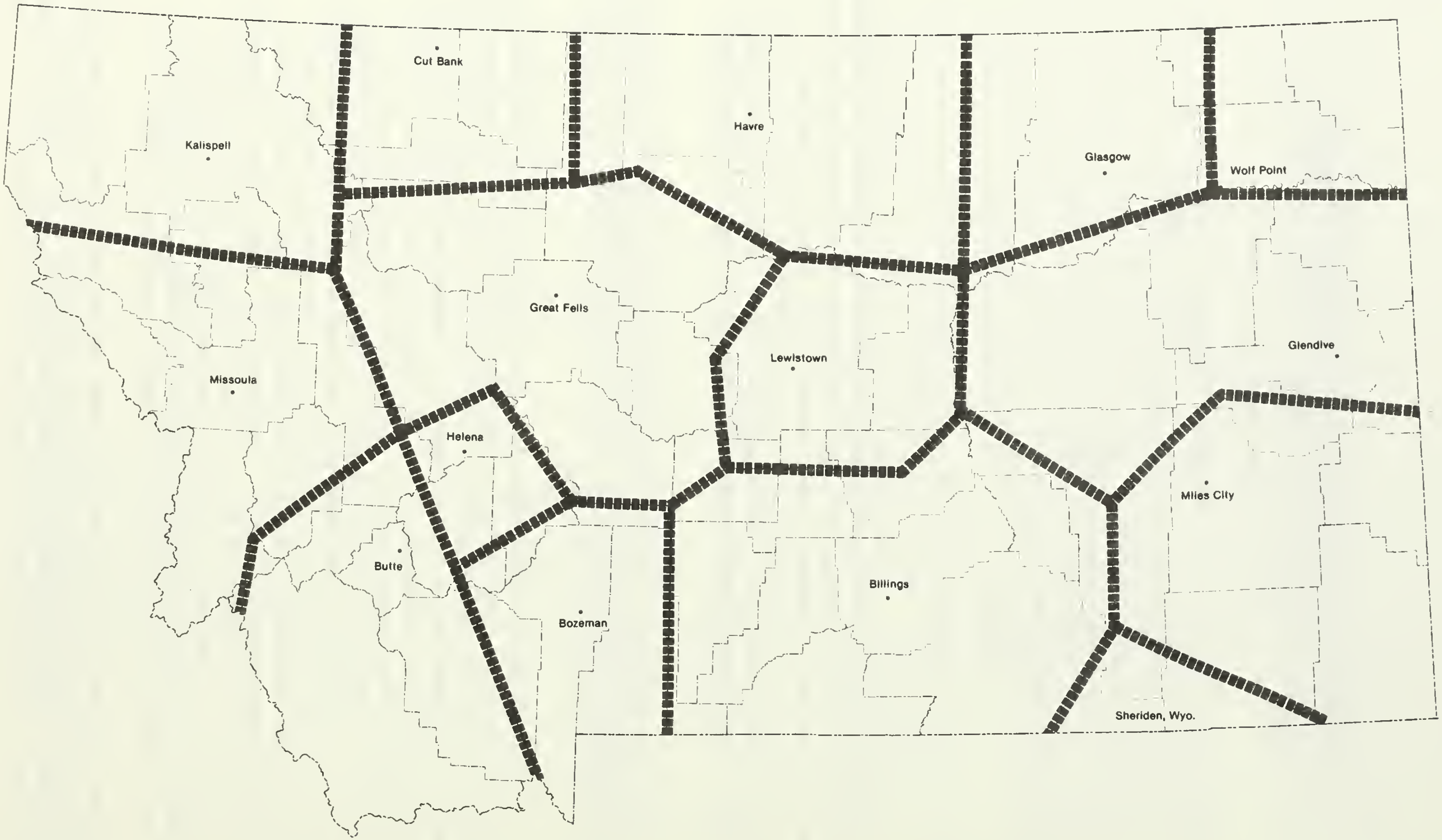

FIGURE II-3.--Primary trade areas in Montana. Source: Western Analysis, 1980.

in 1980 are projected to be $204.67 million of which $53.62 million are shopping goods in Helena. The 1990 total sales are projected to be $323.02 million of which $84.62 million are shopping goods.

There is currently about 550,000 square feet of retail floor space in Helena devoted to comparison goods, concentrated in 6 basic locations (see Land Use). Sales by location were estimated on the basis of center size and store mix. Therefore, the sales figures are not an actual measurement of sales, but instead represent an allocation of total Helena sales (see table II-4).

Of the estimated 550,000 square feet of retail floor space, only about 120,000 square feet is currently in enclosed mall-type stores. The existing mall (Capital Hill) is presently smaller than the centers in similar sized communities which presently have malls. Although no standards exist, the proposed Frontier Mall is somewhat larger than found in most small cities (see table II-5). One exception to this generalization is Logan, Utah, which has a mall about the same size as the proposed Frontier Mall. Logan, however, has a larger trade area than Helena.

The information in table II-5 was obtained by contacting every city west of the Mississippi River that had a 1975 population similar to Helena's (20,000 to 32,500) that was in a county of similar population to Lewis and Clark in 1970 and in 1975 (20,000 to 50,000). Nearly half of those cities had enclosed malls.

C. COMMUNITY SERVICES AND FINANCING

Community facilities and services which would have to be expanded as a result of Frontier Mall are discussed in chapter III, Community Services and Financing. This section briefly describes the facilties on or near the mall site and discusses the potential for financing needed improvements.

1. Sewer and Water System

A 24-inch outfall sewer main runs along the southern frontage of the proposed mall site, parallel to Custer Avenue on the north side. This sewer main currently carries most of the sewage from the west side of Helena to the city sewage treatment plant. The capacity of this sewer main is more than adequate to accomodate the additional sewage discharge (18,000 gallons per day) from the proposed mall complex (R. A. Nisbet, Director of Public Utilities, City of Helena, oral commun., 1980).

The depth of the existing sewer main averages 4 feet from the surface. If this sewer main is used, a lift station would be required to move the effluent from the mall up to the level of this main (R. A. Nisbet, oral commun., 1980).

The Malben-Woolston system encompasses nearly 90 percent of the water distribution system for the City of Helena. The lower zone

TABLE II-4.--Retail floor space and sales by center

[Floor space data are in square feet; sales are for 1980 in millions of 1977 dollars]

[Source: Western Analysis, 1980]

Category	Downtown	Capital Hill	Northgate	Lundy	Hustad	Cedar (South)	Total
Hardware	9,650	-	13,860	-	12,000	3,000	38,510
General merchandise--	42,500	41,000	93,150	37,231	-	-	213,881
Apparel--------	27,875	30,143	2,000	1,000	1,500	-	62,518
Furniture------	22,375	10,000	18,000	23,715	400	8,000	82,490
Appliances-----	5,895	4,000	-	-	-	4,500	14,395
Music----------	4,500	5,000	-	1,512	8,000	-	19,012
Drug-----------	3,600	12,400	-	7,025	8,000	-	31,025
Sporting goods-	9,119	-	-	-	6,500	-	15,619
Books----------	5,431	4,300	-	-	-	-	9,731
Jewelery-------	2,893	1,500	-	400	-	-	4,793
Miscellaneous--	15,979	27,706	-	2,512	6,100	2,000	54,297
Total space---	149,817	136,049	127,010	73,395	42,500	17,500	546,271
Sales---------	$13.5	$15.5	$9.7	$7.5	$5.4	$2.0	$53.6

TABLE II-5.--Enclosed mall space in western counties similar in population and principal city size to Lewis and Clark County (December, 1979)

County, state	Population (1975)	Gross Leasable Area (GLA)	Number of malls
Adams, Nebraska-----------	28,839	241,854	1
Nez Perce, Idaho----------	30,555	200,000	1
Lyon, Kansas--------------	31,863	233,179	1
Kleberg, Texas------------	32,823	91,493	1
Jim Wells, Texas----------	33,919	216,000	1
Dodge, Nebraska-----------	36,315	203,253	1
Lewis and Clark, Montana--	36,822	120,000	1
Howard, Texas-------------	38,170	221,131	1
Walla Walla, Washington---	42,934	143,000	1
Silver Bow, Montana-------	43,034	240,000	1
Twin Falls, Idaho---------	46,456	268,682	2
Cache, Utah---------------	47,809	350,000	1

of this system includes the areas adjacent to the proposed mall site within the city limits. The Malben Reservoir at the south edge of central Helena is principally supplied with water from the Missouri River and from Tenmile Creek by means of a cross-town connector from the Woolston Reservoirs. The Woolston Reservoirs at the base of Mt. Helena Park are supplied mainly by the Tenmile supply line (City of Helena, 1978).

There are two potential sources of city water from the Malben-Woolston system that would provide adequate fire flows to the mall. One source is located to the southeast near the new Helena airport terminal. The other source, which would require two separate new connector lines, is located to the south of the proposed building site within the Helena city limits.

Existing fire flows available for the protection of the buildings near the Montana Avenue-Custer Avenue intersection are substandard (C. R. Hanson, Director of Public Service, City of Helena, oral commun., 1980). Therefore, one of the sources mentioned above would have to be utilized to insure adequate fire flow protection for the proposed mall.

2. Fiscal Conditions

With the annexation of the mall site to the City of Helena, the city would incur most of the costs of providing services to the mall--as well as the revenues (see chapter III, Community Services and Financing).

More than 56 percent of the county's taxable value is located in the city of Helena (Montana Taxpayers' Association, 1979); as a result, the tax coverage is slightly better than the county's and the other major cities of western Montana. Among the five largest cities in Montana, only the taxpayers in Billings had a lower total mill levy than Helena's. The city of Helena levied a total of 64.32 mills in FY 1979. The general fund levy was 61.10 mills, 94 percent of the allowable maximum (see table II-6).

D. TRANSPORTATION

1. Traffic Flow

The proposed mall site is in a growing area at the junction of North Montana Avenue and Custer Avenue (see fig. I-1). Both are major urban routes extending into the Helena Valley. The Montana Department of Highways analyzed traffic flows at the mall site in 1978, the year the mall was first proposed. At that time, traffic flow was generally unimpeded and was well within an acceptable range of operation.

Traffic on Custer Ave. is expected to increase 4 percent per year in the absence of Frontier Mall; on Montana Ave., 3 percent per year (Montana Department of Highways, Planning and Research Bureau, unpublished report, June 11, 1979). This rate of traffic increase will require improvements to the intersection, including two approach lanes on Custer Avenue. West

TABLE II-6.--Mill levy for Montana cities with a population more than 20,000 in 1977-78 and 1978-79

[Source: Montana Taxpayers Association, 1979]

City	County Mill Levy		School Mill Levy		City Mill Levy		State Mill Levy		Total Mill Levy		Percent Change
	1977-78	1978-79	1977-78	1978-79	1977-78	1978-79	1977-78	1978-79	1977-78	1978-79	1978-79
Helena	56.55	47.51	167.74	173.46	65.61	64.32	5.94	6.00	295.84	291.29	-1.5
Billings	35.90	35.73	146.45	138.97	71.25	69.30	5.94	6.00	259.54	250.00	-3.7
Butte	103.61[a]	102.25[a]	195.35	194.72	---	---	5.94	6.00	304.90	307.81	+1.0
Great Falls	45.80	47.39	169.10	166.56	75.86	80.65	5.94	6.00	296.70	300.60	+1.3
Missoula	46.34	37.30	166.97	168.54	82.73	76.98	5.94	6.00	310.77	294.98	-5.1
Average	46.51	41.98	169.12	168.45	73.86	72.81	5.94	6.00	233.55	288.94	-1.6

[a] Combined city-county government.

of the intersection, a lane for through traffic and left turns and a lane for right turns is needed; east of the intersection, a lane for through traffic and right turns and a lane for left turns is needed. With this improvement, which is possible on the existing roadway without major reconstruction, intersection operation without the mall will be adequate up to 1985. By 1985 a signal phase to accommodate heavy left turn traffic from northbound Montana Ave. onto Custer Ave. will be needed. The adjustment is possible with existing equipment.

Normal traffic increases will create congestion at the intersection by about 1990. Major improvements will be required to provide acceptable driving conditions through the intersection. The apparent need is for an additional lane approaching the intersection southbound on Montana, thus providing a through and right turn lane, a through lane, and a left turn lane. South of the intersection, Montana Ave. would have to be widened to four lanes with median to ensure lane balance and alignment. The extension would logically extend south to Cedar Street. With these improvements and with minor adjustments of traffic control devices, adequate service can be expected up to about the year 2000. Major improvements will probably then be required to correct congestion at the intersection. Montana Ave. will require exclusive approach lanes for right turns; Custer Ave. will need three approach lanes and a signal phase for left turns onto Montana Avenue.

2. Safety

The Custer-Montana intersection has little provision for the safety and convenience of pedestrians and bicylists. The intersection does not have marked pedestrian crossings and signals. The bicycle path immediately south of Custer Ave. west of the intersection does not cross the intersection as a marked lane. Use of the intersection by pedestrians and bicyclists is limited, mostly because only two corners of the intersection are developed.

E. EMPLOYMENT AND INCOME

1. Employment

Employment in Lewis and Clark County is dominated by 5,400 jobs in State and Federal government which accounted for two-thirds of the basic employment in 1977 (see table II-7). The remainder of the basic employment is associated with a few private employers, e.g. the ASARCO lead and zinc smelter, Columbia Paint, Mountain Bell, and agriculture (Lewis and Clark County, 1979). Non-basic (ancillary) employment provides 13,440 jobs in the county, about 63 percent of the total. The distribution between ancillary industries is generally very similar to the distribution statewide (see table II-7). More than half (56.5 percent) of the county's ancillary sector jobs are in either the trade or service industry, with 26 percent in trade alone.

TABLE II-7.--Basic and nonbasic employment in Lewis and Clark County and Montana (1970, 1977)

[Source: Lewis and Clark County, 1979]

	1970		1977	
Basic	Lewis & Clark	Montana	Lewis & Clark	Montana
Agriculture	590	38,900	430	31,200
Mining	20	6,600	20	6,100
Manufacturing	1,000	23,800	1,100	25,100
Federal Government	1,200	18,100	1,600	23,700
State Government	2,600		3,800	
Transportation, Communication	400	6,600	500	6,300
Tourism		9,400		11,200
Lodging	200		500	
Total	6,010	103,400	7,950	103,600
Nonbasic (Ancillary)				
Construction	790	11,100	840	15,700
Transportation, Communication, Utilities	700	10,800	1,000	13,400
Trade	2,100	44,900	3,500	63,700
Finance	900	7,900	1,300	11,600
Services	3,100	34,500	4,100	51,000
State & Local Government	1,000	41,800	1,300	51,500
Self-employed, Nonfarm	1,400	30,200	1,400	29,100
Total	9,990	181,200	13,440	236,000
Total Employment	16,000	284,600	21,400	339,600

Increases in government employment accounted for 1200 new jobs between 1970 and 1977, over 60 percent of all new jobs in the economic base sector. These jobs represent an increase to the sector of 32 percent. Over the same period, the State as a whole had only a 0.2 percent increase in its basic employment sector. Consequently, total employment grew much more rapidly in Lewis and Clark County than it did statewide--34 percent compared to 19 percent. Helena's economic growth during the 1970's is mostly attributable to State government, which experienced both significant employment increases and a sizeable rise in average earnings per worker, due to the one time upward adjustment in the salaries of State workers which occurred in 1975-76 (Lewis and Clark County, 1979).

Lewis and Clark County is not likely to experience the same relatively rapid rate of job formation in the near future. Increasing concern over the costs of State government has resulted in an implicit State policy of slow or no growth in full-time State employees. State government employment has remained stable since 1977, and projections indicate that there will be little, if any, growth in the number of State employees over the next several years (Lewis and Clark County, 1979).

Although employment in the county increased at a relatively rapid rate between 1970 and 1978, the labor force grew more rapidly, resulting in an increase in the unemployment rate (see table II-8). Even though Lewis and Clark County's employment growth rate exceeded that for the State, and the county unemployment rate averaged 1 percentage point less than the State, the county experienced relative increases in unemployment and unemployment rates which were higher than for the State as a whole. The county's relatively high rate of in-migration and participation rate accounts for this difference (Lewis and Clark County, 1979).

TABLE II-8.--Labor force, employment, and unemployment, Lewis and Clark County and Montana, 1970-78

[Source: Lewis and Clark County, 1979]

	Lewis and Clark County			Montana		
	1970	1978	Percent Increase	1970	1978	Percent Increase
Civilian labor force	15,725	24,172	54	273,021	370,000	36
Employment	15,185	22,883	51	261,171	348,000	33
Unemployment	540	1,289	140	11,850	22,000	80
Unemployment rate	3.4%	5.3%	56	4.8%	6.0%	25
Average (1970-78)		4.4%			5.5%	

Proportionately more of Lewis and Clark County's population was employed in 1977 than in any other Montana urban county (Lewis and Clark County, 1979). This higher-than-average level of employment participation is largely due to the relatively large number of women in the labor force and that they have found jobs in State and Federal government.

Two-thirds of the total employment in the Helena urban area is concentrated in five major zones (see figure II-4): 25.5 percent is located in zone 1, 20.7 percent is located in zone 27, and zones 17, 19 and 24 contain between 5 and 9 percent each. This concentration of employment has had a major effect on the location of commercial development (see Land Use).

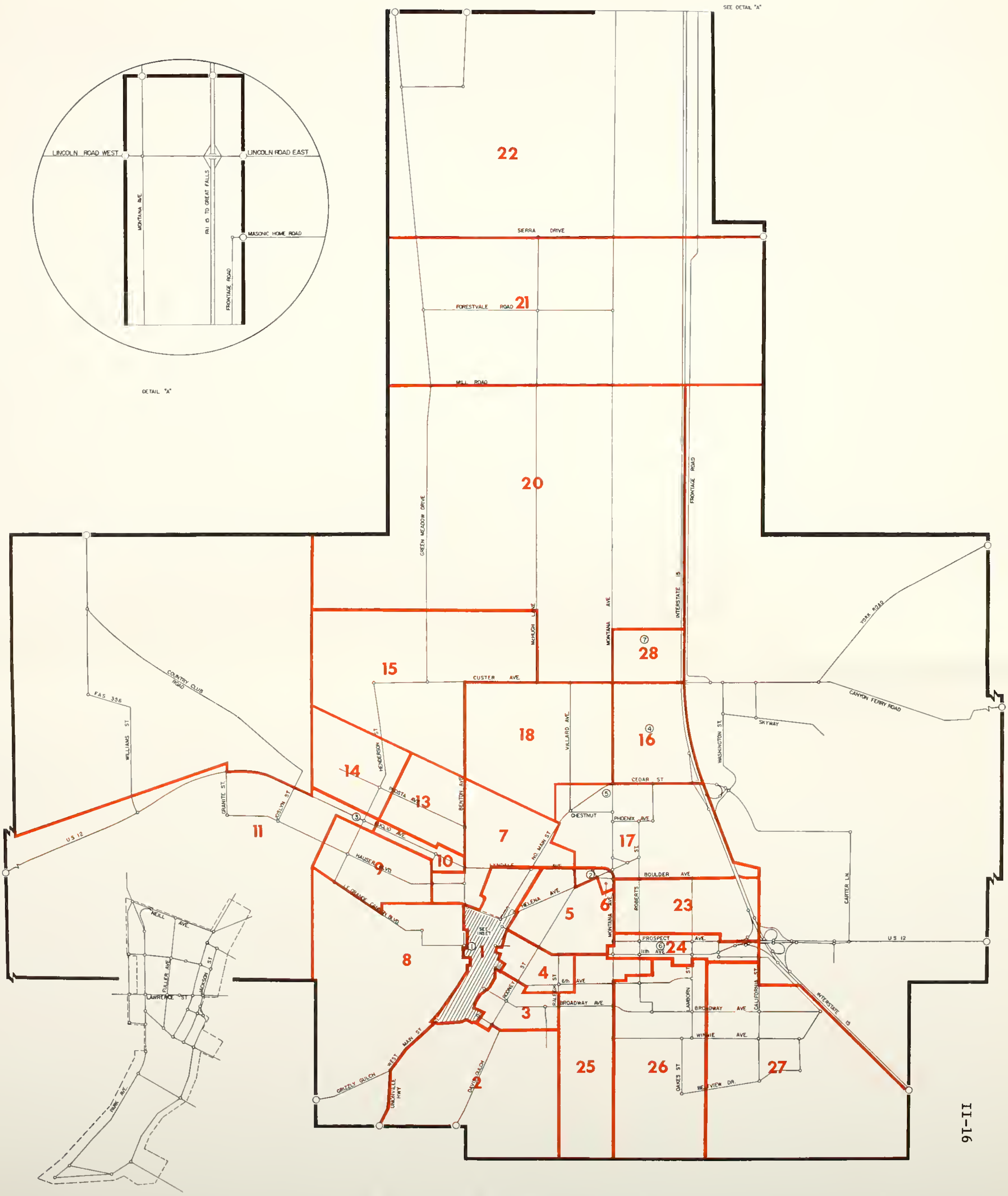

FIGURE II-4.--Helena area urban transportation zones, adapted from Montana Department of Highways and others (1974).

2. Income

Since 1970, per capita personal income in Lewis and Clark County has been from 7 to 24 percent higher than the State average and was higher than any other urban county in the State (U.S. Department of Commerce, 1979c). This is principally due to the higher percentage of the population that is employed in the county. Per capita personal incomes have been increasing more slowly in the county than statewide (7.6 percent average annual increase compared to 8.2 percent--U.S. Department of Commerce, 1979c).

Lewis and Clark County's personal income, because of its employment base, depends very heavily on the public sector (see appendix B). This tends to make personal income in the county more stable since the more volatile sources--agriculture in particular--do not form a major part of the total (see fig. II-5). The retail trade sector had the lowest earnings per employee among the urban occupations in the county; jobs in the construction trade paid the best (see Appendix B and table II-7).

F. SOCIOLOGY

The projected population for Lewis and Clark County in 1980 is 44,700 (Lewis and Clark A.P.O.,1979). Since 1950 the population slowly increased until 1970 when growth became more dramatic. Between 1970 and 1977 the county's population increased 18 percent--nearly twice the State's growth of 9.6 percent (Lewis and Clark County, 1979). This increase was greater than all other predominantly urban counties in Montana except Gallatin County (U.S. Department of Commerce, 1979a).

The county's growth is largely due to the scenic and lifestyle amenities of the area, and expanded employment in State government, trades, and services (Lewis and Clark County, 1979). The county's population is projected to reach 53,500 by 1990--an increase of 8,800 over the projected 1980 population (Lewis and Clark A.P.O., 1979). The past and projected population trends for Lewis and Clark County are shown in figure II-6. Assuming 2.57 people/household (the current household size), the population increase would add 3400 new households to the county.

The age distribution of Lewis and Clark County's population is very similar to the composition of the State as a whole. Minorities composed about two percent of the county population in 1970, two-thirds were American Indians, and the remainder were Spanish-American (Lewis and Clark County, 1979.)

Most of the county's population is concentrated in the Helena urban area. In 1978 39,700 people or approximately 94 percent of the estimated county population lived in the "Helena study area" which included the City of Helena, East Helena, and much of the Helena Valley (Lewis and

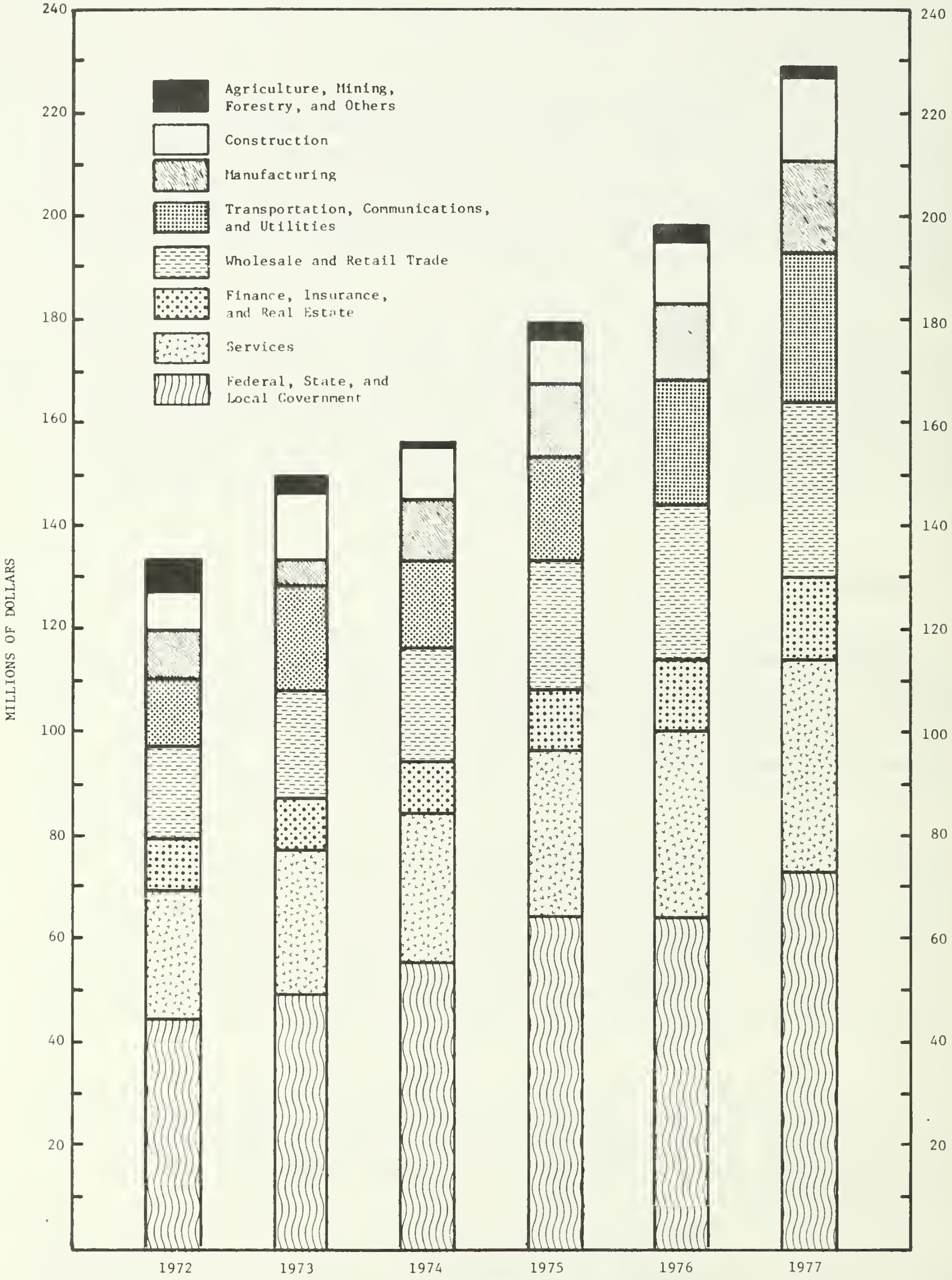

FIGURE II-5.--Distribution of personal income in Lewis and Clark County.

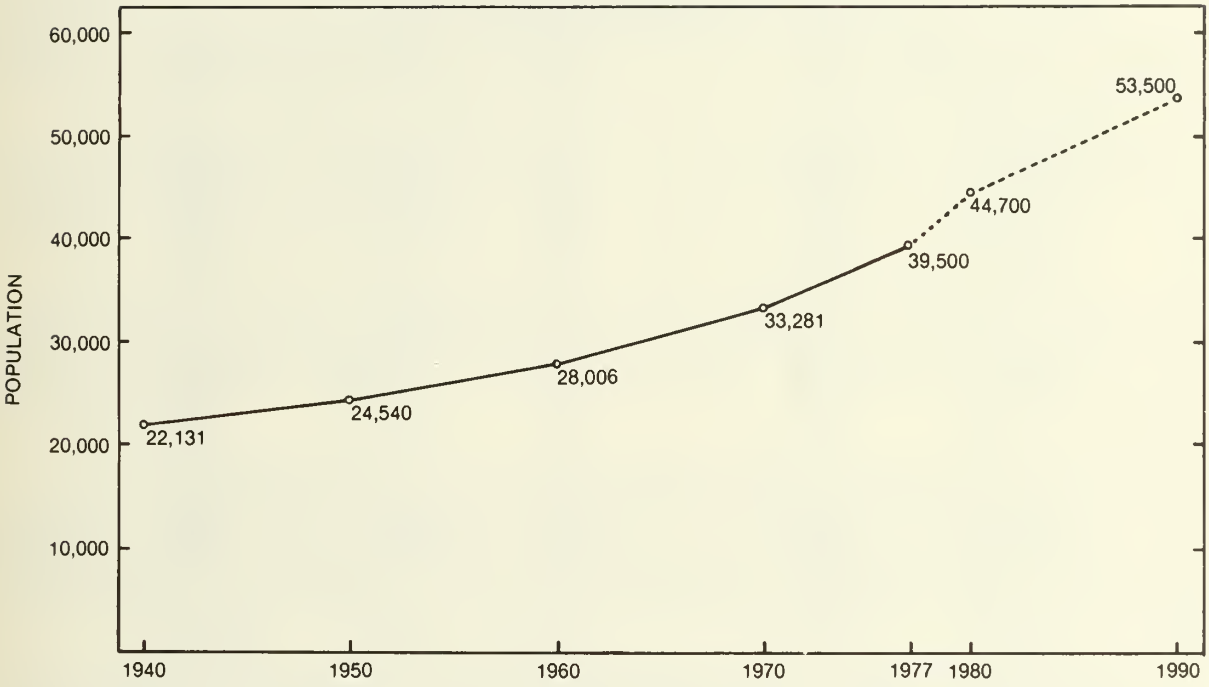

FIGURE II-6.--Population trends for Lewis and Clark County. Sources: U.S. Department of Commerce, 1976 (1940 to 1970); U.S. Department of Commerce, 1979 (1978); Lewis and Clark A.P.O., 1979 (1980 and 1990).

Clark County, 1979). Ten percent of Helena's households are located within 1 mile of the proposed mall site at the intersection of Montana and Custer Avenues. Fifty percent are within 1 mile of the central business district. Forty-five percent are within 1 mile of an existing shopping center at the intersection of Eleventh Avenue and Sanders Street. Table II-9 shows the distribution of population in Helena by the zones shown in fig. II-4.

TABLE II-9.--Population distribution by zone

[Source: Lewis and Clark A.P.O., 1979.
Zones are shown in fig. II-4.]

Zone	1980	1990	Zone	1980	1990
1	1,107	1,128	16	188	188
2	1,113	1,477	17	1,692	2,030
3	1,495	1,654	18	1,477	1,709
4	1,044	1,072	19	818	1,416
5	1,853	1,993	20	1,256	1,601
6	19	19	21	1,211	1,419
7	1,437	1,439	22	879	1,123
8	1,302	1,365	23	1,617	1,842
9	1,729	1,879	24	38	38
10	109	100	25	1,219	1,326
11	1,818	2,690	26	1,547	1,637
12	1,110	1,599	27	2,076	4,188
13	1,146	1,228	28	0	0
14	1,138	1,396			
15	1,665	2,084	Total	32,013	39,640

G. CULTURAL RESOURCES

1. History

The following information is drawn largely from a historical survey of the Prickly Pear Valley by Walter (1980).

Gold was discovered in the Prickly Pear Valley's Last Chance Gulch in 1864. In December of the same year another rich strike in nearby Confederate Gulch established the Helena Valley as one of the earliest population centers in the Montana Territory.

Helena's permanency resulted from its location at the intersection of the main east-west and north-south wagon roads, and because mining the rich quartz lodes required capital investment over an extended period for mining and milling. The Prickly Pear Valley supplied livestock and agricultural products needed by the miners and other city residents.

Helena became the logical headquarters for banking, freighting, wholesaling, and mining concerns. The Northern Pacific Railroad began operating its mainline through the valley in 1883 further securing Helena's importance as a transportation hub.

Between 1880 and 1890 Helena's population grew from about 4,000 to nearly 14,000. The population remained concentrated at the base of Mt. Helena and Mt. Ascension. The adjacent valley remained rural. An exception was the Helena and Livingston Smelting and Reduction Company's plant that was constructed in the area that became East Helena.

In 1893 the Sisters of Charity opened the St. Joseph's Orphan Home on 3-1/2 acres of the proposed mall site. The orphanage grounds expanded to 99 acres and included a schoolhouse, a laundry, a bakery, a barn for the dairy herd, a large vegetable garden, and an outdoor swimming pool.

From 1910 to 1960 the population of Helena increased more slowly, from 12,515 to 17,581, dropping to 11,803 in 1930. The national depression of the 1930's reduced the Helena Valley's economic activity; the earthquakes of 1935 damaged structures throughout the valley, including the orphanage.

Following World War II, the local economy improved and population slowly increased. Residential and commercial tracts expanded north into the valley. Many businesses left Helena's downtown. The number of children at the orphanage declined, however, and the home closed in the fall of 1965. Several years later the buildings were razed.

In 1968 the city began an urban renewal project designed to preserve and strengthen the downtown central business district (CBD). Over 20 buildings have been restored. Several blocks along Last Chance Gulch were converted to a pedestrian mall.

New development in the district included a six-story shopping arcade and office condominium, a movie theatre, restaurants, offices, other shops, and housing units. Additional construction provided housing for many public facilities: a city-county library, Federal office building, and a neighborhood center. In the renewal process 228 buildings were removed to make way for this new construction and improvements to the street and parking system. A 418-car, three-story parking structure was built 1 block from the downtown mall. A new system of loop and access streets was implemented to serve the area.

The cost of the investment in the CBD totalled $46 million as of May 1979--$24 million in private funds and $22 million of public monies (Don Kerns, City of Helena, oral commun., February 25, 1980).

2. Archaeological Resources

Several archaeological surveys done in the late 1940's and since indicate a high density of archeological sites near the Missouri River. The Helena valley itself has had no archaeological sites reported. (Steere, 1979.)

No archaeological sites were found during the course of the on-the-ground examination of the mall site in November, 1979 by the Mineral Research Center (Steere, 1979). The location of the mall site near several streams suggests a possibility of prehistoric activity in the area. Heavy vegetation covers most of the ground, making detection of surface cultural remains very difficult. Past disturbance of the site has reduced the probability of discovering artifacts.

The Mineral Research Center survey did not find any sites eligible for nomination to the National Register of Historic Places.

H. RECREATION

Recreational facilities in Helena need to be expanded and improved, according to a feasibility study prepared by the City-School Recreation Department of Helena. There is also a need for more recreation opportunities for all age groups.

Helena currently has three indoor movie theater locations, two of which have twin screens. Two drive-in theaters also operate during the summer. One of the theaters is near the Custer-Montana intersection.

Helena has 74 licensed eating establishments. The Montana Department of Revenue has issued 34 all-beverage liquor and 15 beer and wine licenses in the city of Helena and surrounding 5-mile area.

The open space where the proposed mall is planned is not used for any recreational purpose at present. Any such use is at most sporadic. There is one residence on the mall site but no others within a quarter-mile of the site; in addition, the heavy traffic on adjacent Custer and Montana Avenues serve as a deterrent to recreational use.

I. ESTHETICS

The site for Frontier Mall is at a transition from the commercial area around Northgate shopping center to the agricultural and range lands of the Helena Valley. The mall site appears much like other undeveloped range lands in the Valley, even though the land is not currently used for agriculture.

Cottonwood trees and a few spruce trees line the site's frontage along Montana Avenue. The site's proximity to a commercial area enhances its value as a contrast to the urban scene, but also limits its intrinsic esthetic attractiveness.

The land is essentially flat and offers little topographical variety. The strongest visual element is the colors of the grass and trees.

There are no strong patterns on the site itself; however, the adjacent roads (including the Interstate) are strong lines which tend to focus one's vision away from the mall site.

Most people observe the mall site while traveling on the three main nearby roadways: Montana Avenue, Custer Avenue, and Interstate I-15. The site would likely only attract the attention of a person travelling north on Montana past the Custer intersection, or east on Custer past the intersection with Montana: the site is an abrupt change from the commercial areas further south on Montana and west on Custer, and provides a view across the valley to the Big Belt Mountains. A person entering Helena from the north on Montana, or from the east on Custer, would be more likely to focus on the buildings and signs of the adjacent commercial area than the mall site. There is little on the site to draw the attention of a person traveling on I-15.

The mall site is not a foreground area for any homes. The site's fields and trees form a middleground view to the south for a dozen or so homes along Beaverhead Drive.

J. CLIMATE

The climate of the Helena area is modified continental: precipitation is low and falls primarily during the warmer months; surface humidity and wind speeds are moderate. Seasonal and daily temperatures vary less than in a true continental climate due to the protection of the surrounding mountains, Pacific Ocean air masses invading from the west, and cool air draining down the surrounding mountains into the valley.

Wind direction and speed are important in the transport of air pollutants. In the bowl-like Helena valley, very low wind speeds may be associated with a stagnation condition, whereas higher wind speeds ventilate the valley, clearing out any accumulations of air pollution that might be present. The annual wind rose (figure II-7) shows that the most frequent wind direction at the Helena airport is from the west. The annual occurrence of west wind is reported to be 18 percent; west-northwest and west-southwest winds are reported to be 14 and 13 percent, respectively; the total within these three sectors is 45 percent of the total wind. Easterly winds occur less frequently. In general, the wind rose for Helena is symmetrical about the east-west axis. Calm is obsered 9 percent of the year. Surface wind speeds are shown in table II-10. Summer winds are slightly faster than either spring, fall or winter winds--the only seasonal variation. Due to the sheltering influence of

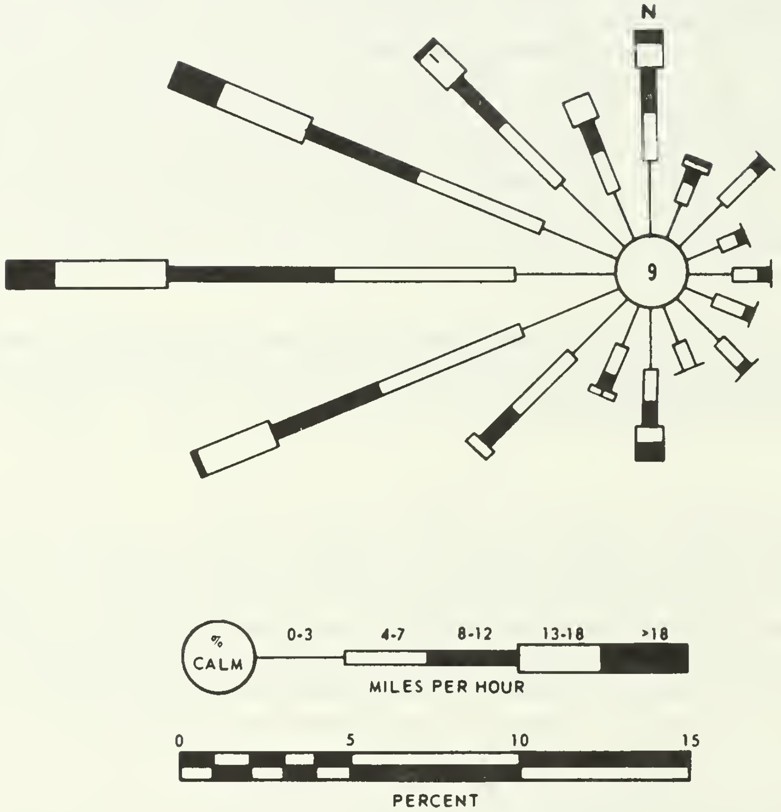

FIGURE II-7.--Annual wind rose for Helena, Montana.
Source: U.S. Environmental Protection Agency (1972).

TABLE II-10.--Seasonal and annual inversion frequency at Helena[1]

[Source: Hosler, 1961]

Season	Frequency (Percent of total hours)
Winter	47
Spring	32
Summer	32
Fall	45
Annual	38

[1] Inversion or isothermal conditions, based below 500 feet above station elevation

the mountains, Chinook winds are not as pronouned as might be expected for a location on the eastern slope of the Rocky Mountains. Strong winds can occur at anytime throughout the year, but generally do not last more than a few hours at a time.

Temperature inversions occur throughout the year in the Helena valley (table II-10). Inversions can occur when very cold continental air masses are sufficiently deep to either spill over the Big Belt Mountains to the north and east or enter the Helena valley from the north via the Missouri River valley. Afterwards the cold air is walled in by the surrounding mountains. With this condition, there is a layer of warmer air above the cold air--a temperature inversion--that can act as a lid and trap air pollution below it. Other factors favoring the formation of strong and persistent temperature inversions in the Helena valley are the altitude (3800 feet), relative dryness, long winter nights, lack of cloudiness, and frequent snow cover during the winter. All of these factors tend to increase radiation of heat from cooling of the ground surface. The sheltering effects of the surrounding mountains produce low wind speeds and calms which inhibit dispersion of pollutants.

A mixing layer that has its base at the earth's surface is caused by turbulent motions created by the mechanical flow of air over and around obstacles and by thermally produced air currents. Mixing erodes and can destroy an inversion layer; thorough mixing produces a condition in which temperature decreases with height. The depth of the mixing layer usually varies diurnally and in Helena (interpolated from isopleth maps, Holzworth, 1972) ranges from less than 1600 feet in the morning to about 6600 feet in the afternoon. The seasonal variation of mixing heights is shown in table II-11.

The meteorological conditions necessary for a potential air pollution episode lasting 2 or more days are rather infrequent in Helena. As defined in a study by the U.S. EPA (1972) a potential air pollution episode

TABLE II-11.--Mean morning and afternoon mixing heights[1] and surface wind speeds in Helena

[Source: Holzworth, 1972; U.S. EPA, 1972]

	Morning Mixing Height (Feet above ground level)	Surface Wind Speed (MPH)	Afternoon Mixing Height (Feet above ground level)
Spring	2,000	9.0	8,200
Summer	1,300	7.7	9,200
Fall	1,300	7.2	5,900
Winter	1,600	7.8	3,300
Annual	1,600	7.9	6,600

[1] The mixing height is defined as the height above the surface through which relatively vigorous vertical mixing occurs.

is a situation in which the mixing height is equal to or less than 4920 feet, and the wind speed through the mixing layer is equal or less than 8.9 mph. By this definition, the total number of potential episode-days during 5 years for Helena is estimated to be approximately 25. For comparison, the Great Salt Lake Valley in Utah has 10 times as many episode-days as Helena (U.S. EPA, 1972).

Annual precipitation is 9 to 10 inches (semiarid) in the nothern and eastern portion of the Helena valley and 11.4 inches at the Helena airport. Snowfall averages about 50 inches/year; blizzards are infrequent. Severe ice, sleet, and hail storms are rare. Since 1880 only one hailstorm has caused extensive damage in the City of Helena (U.S. Department of Commerce, NOAA, 1979). Summer temperatures are moderate with the maximum generally under 90°F. Below-zero °F temperatures occur occasionally during every winter.

K. AIR QUALITY

1. Summary

Vehicle traffic is the primary non-point pollution source in the Helena Valley. The smelter complex located 4 miles east of Helena and residential wood burning stoves are the primary point sources. Emissions from the smelter have been discussed at length elsewhere (U.S. EPA, 1972; Montana Department of Health and Environmental Sciences, 1979b) and are not addressed in this analysis. During the next 10 years, automobile exhaust emissions will decrease substantially, and fugitive dust emissions from vehicle travel will remain unchanged; pollutant emissions from wood stoves will increase and may become a problem during the winter.

Areas of major traffic congestion in the Helena area, including the North Montana-Custer intersection near the proposed mall site, may presently exceed the Federal 8-hour ambient air quality standard for carbon monoxide.

2. Helena Valley

The only air pollutant being monitored in the City of Helena is total suspended particulate (TSP); the high-volume sampler is located on the roof of the Cogswell Building in the Capitol complex. The monitoring results (table II-12) show that the Federal secondary ambient air quality standard (AAQS; table II-13) for 24-hour concentrations has been exceeded 3 of the past 4 years. The annual geometric mean (AGM) also appears to be increasing; in 1979 the TSP AGM was about 93 percent of the Federal secondary AAQS.

TABLE II-12.--Total suspended particulate concentrations measured at the Cogswell Building, Helena, Montana

Year	AGM*	24 hour Maximum	24 hour Second highest
1976----	45	162	154
1977----	40	208	169
1978----	46	234	196
1979----	56	238	143

*Annual geometric mean.

The primary source of TSP is probably street dust continually suspended by automobile traffic. Best estimates (table II-14) show that fugitive dust accounts for over 85 percent of the particulate emissions. The remaining 702 tons of particulate are emitted from automobile exhaust, tire wear, and wood burning stoves. In 1990, fugitive dust emissions are not expected to change; particulate emissions from automobiles will decrease by 24 percent and those from wood burning stoves will increase by 20 percent. Total particulate emissions are not expected to change from 1980 to 1990.

The principal gaseous pollutants from vehicular exhaust and wood burning stoves are, in decreasing order by weight: carbon monoxide (CO), hydrocarbons (HC), and nitrogen oxides (NO_x), and to a much lesser extent, sulfur oxides (SO_x; table II-14). In 1980, automobile emissions will be the major source of all the gaseous emissions.

TABLE II-13.--Ambient air quality standards

	National					Montana[f]		
	Primary		Secondary					
	ug/m3	ppm	ug/m3	ppm	Notes	ug/m3	ppm	Notes
Sulfur oxides								
Annual average----	80	0.03			a	52	0.02	a
24-hour average---	365	0.14			b	260	0.10	b
3-hour average----			1,300	0.50	b			
1-hour average----						1040	0.4	b
Suspended particulates								
Annual geom. mean-	75		60		a	75	-	a
24-hour average---	260		150		b	200		b
Carbon monoxide								
8-hour average--	10,000	9	same		b	10,000	9	b
1-hour average--	40,000	35			b	19,000	17	b
Photochemical oxidants (Ozone)								
1-hour average--	160	0.08	same		b	200	0.10	b
Lead------------	1.5		same		c	1.5		c
Nitrogen dioxide								
Annual average--	100	0.05	same		a	100	0.05	a
1-hour Average						340	0.17	b
Nonmethane hydrocarbons[g]								
3-hour Average	160	0.24	same		e			
Particle fallout					grams/m^2-mo.	Tons/mile^2-month		
					10		28.5	h

[a] Never to be exceeded.
[b] Not to be exceeded more than once per year.
[c] Calendar quarter average
[e] Applies to 3-hour period 6 to 9 a.m. daily.
[f] Proposed in Montana ambient air quality standards study draft EIS, 1979.
[g] Set as a guide to achieve photochemical oxidant standards.
[h] 30-day average

ppm = Parts per million.
ug/m3 = Micrograms per cubic meter.

TABLE II-14.--Estimated pollutant emissions in the Helena area

[Methodology on file with the Department of Highways]

	Emissions (tons/year)											
	Particulate		CO		HC		SO_x		NO_x		Fugitive dust	
Source	1980	1990	1980	1990	1980	1990	1980	1990	1980	1990	1980	1990
Wood burning stoves------	490	585	3185	3802	270	319	2.4	2.9	24.5	29.2	---	---
Automobiles---	212	161	25802	4842	4012	1046	90.5	93.7	1688	842	4282	4388
Total-------	702	746	28987	8644	4282	1365	92.9	96.6	1712	871	4282	4388

As the Federal Automobile Emission Standards become more stringent and fuel efficiency increases, the total amounts of each exhaust pollutant emitted will decrease, with the exception of SO_x. The emissions from wood burning stoves will increase to some extent (table II-14). Therefore, with regard to the gaseous pollutants, the Helena area air quality is expected to improve by the year 1990.

There are no monitors in Helena for any of the above pollutants. Based on other studies (Montana Department of Highways and Montana Department of Health and Environmental Sciences, 1978; Tacoma City Planning Department, 1976; King County Department of Planning and Community Development, 1979) a maximum background concenration of 2 ppm (parts per million) CO can be assumed. Estimates made by the King County Department of Planning and Community Development (1979) indicate maximum NO_x concentrations to be 6 percent of the CO concentration, or about 0.12 ppm. The same study estimates maximum HC concentrations to be about 9 of the CO concenration, or about 0.18 ppm. These figures are meant to be approximations and will be used in the chapter III air quality analysis.

3. Mall Site

During peak traffic, CO concentrations may exceed the Federal AAQS of 9 ppm (table II-15) at the N. Montana-Custer intersection near the mall site. This estimate is based on a preliminary screening methodology developed by the U.S. EPA (1975) which probably overestimates actual CO concentrations. Additional explanation is contained in a report on file with the Montana Department of Highways.

As Federal emission standards become more stringent, and automobile exhaust emissions decrease, the pollutant concentrations at the North Montana-Custer intersection will also decrease.

TABLE II-15.--Estimated peak 1-hour and 8-hour pollutant concentrations at the North Montana and Custer intersection

Pollutant	Concentration (ppm) 1 hr.	8 hr.	Background	Total concentration 1 hr.	8 hr.
CO----------	15.4	9.2	+ 2	17.4	11.2
NO_x---------	0.9	0.6	+ ?	0.9	0.6
HC----------	1.4	0.8	+ ?	1.4	0.8

L. NOISE

Estimated present sound levels at the intersection of North Montana Avenue and Custer Avenue are below those determined by EPA to cause any hearing loss. Interference with normal outdoor conversation within 100 feet of the intersection probably does occur, but there are no annoying or interfering effects on indoor activity in the area. Major existing sound sources in the vicinity are vehicle traffic on North Montana and Custer, commercial activity at the Northgate Plaza Shopping center, and periodic aircraft flyover. Also contributing to the residual sound level are traffic on Interstate 15 and various activities associated with commercial development in rural areas.

Current and future sound levels at the mall site are estimated using data from a sound survey in King County, Washington. (King County Dept. of Planning and Community Development, 1979). A sound survey at the mall site could not be conducted in time for inclusion in this EIS because of winter conditions which would have distorted sound measurements.

Day-night sound levels at the 14 monitoring sites in King County ranged from 49 to 70 decibels (dB) and were representative of normal levels expected with primarily local traffic. At an intersection with a traffic count similar to that of the N. Montana-Custer intersection, 29,800 vehicles and 28,902 respectively, the sound levels in table II-16 were recorded and estimated. These sound levels are similar to those reported elsewhere (Eldred, 1974). By 1995 computer simulation (Morrison-Maierle, 1979) has shown that a sound level of L_{dn} 65 would occur over much of the area. This would possibly preclude certain land uses in that area. See chapter IV, Alternative Uses of the Mall Site.

The sound levels, "L_x" are categorized according to the level of sound exceeded "x" percent of the time. For example, L_{10} represents a sound level exceeded 10 percent of the time and is the intrusive sound level; L_{50} represents the median sound level; L_{90} represents the residual sound level; and L_{e9} represents the equivalent steady-state sound level which provides an equal amount of acoustical energy as the

TABLE II-16.--Sound levels (dB(A)) at an intersection similar to N. Montana-Custer--Site #14 in King County (1979)

[Source: King County Dept. of Planning and Community Development, 1979]

	Measured				Estimated		
Time	L_{10}	L_{50}	L_{90}	L_{e9}	L_d	L_n	L_{dn}
2:40-3:00 p.m.	64	53	43	60			
Noon-6:00 p.m.	65						
					61	53	62

time varying sound. The estimated day and night sound levels are represented as L_d (7:00 a.m. to 10:00 p.m.) and L_n (10:00 p.m. to 7:00 a.m.) respectively. L_{dn} is the day-night sound level with a 10 dB (A) nighttime weighting.

The estimated L_{e9} of 60 and L_{dn} of 62 at the Custer-Montana intersection are below the level of 70 dB determined by EPA to cause hearing loss from continuous exposure. Some annoyance and interference with outdoor conversation probably occurs in the vicinity of the N. Montana-Custer intersection. However, allowing a 25 dB decrease for structures with closed windows (Gordon and others, 1971) the present sound levels probably do not cause any interference with indoor activities. For comparison, a listing of activities and their respective sound levels is shown in figure II-8. As can be seen from that figure, the sound levels 100 feet from the N. Montana-Custer intersection is about twice that of normal conversation at three feet.

M. GEOLOGY

1. Structure and Stratigraphy

The Helena Valley is bounded on the northeast by a major northwest-trending fault and on the southwest by another major fault trending in the same direction. These faults have allowed the block of earth between these two faults to drop down relative to the surrounding mountains, creating the Helena Valley. The fault along the southwest border of the Helena Valley (Prickly Pear Fault) has been identified in bedrock northwest and southeast of Helena (see fig. II-9). Over 6,000 feet of offset has been reported along portions of this fault with the northeastern side (towards valley) down.

Unconsolidated valley fill sediments (mid-Tertiary age; 2 to 65 million years ago) lie on top of the down-dropped block, approaching 1200 feet in depth. These unconsolidated valley fill sediments are composed

Continuous Exposure Can Cause Hearing Loss	140	Threshold Of Pain
	130	
	120	Jet Takeoff (200 Feet)
		Auto Horn (3 Feet)
	110	Chainsaws, Noisy Snowmobiles (50 Feet)
	100	Lawn Mower, Power Tools (3 Feet)
		Noisy Motorcycle (50 Feet)
	90	Heavy Truck (50 Feet)
	80	
Speech Interference		Quiet Snowmobile (50 Feet)
		Busy Urban street
		Quiet Motorcycle (50 Feet)
	70	Normal Automobile
	62	ESTIMATED L_{dn} AT CUSTER-N. MONTANA INTERSECTION (100 feet)
	60	Conversation (3 Feet)
Sleep Interference	50	Quiet Residential Area
		Library
	40	Quiet Home
	30	
	20	
	10	Broadcasting Studio
	0	Threshold Of Hearing

Note: Decibel are logarithmic, therefore:
50 dB is 10 times as intense as 40 dB
60 dB is 100 times as intense as 40 dB
70 dB is 1,000 times as intense as 40 dB

FIGURE II-8.--Typical sound levels (dB). Source: King County Department of Planning and Community Development, 1979.

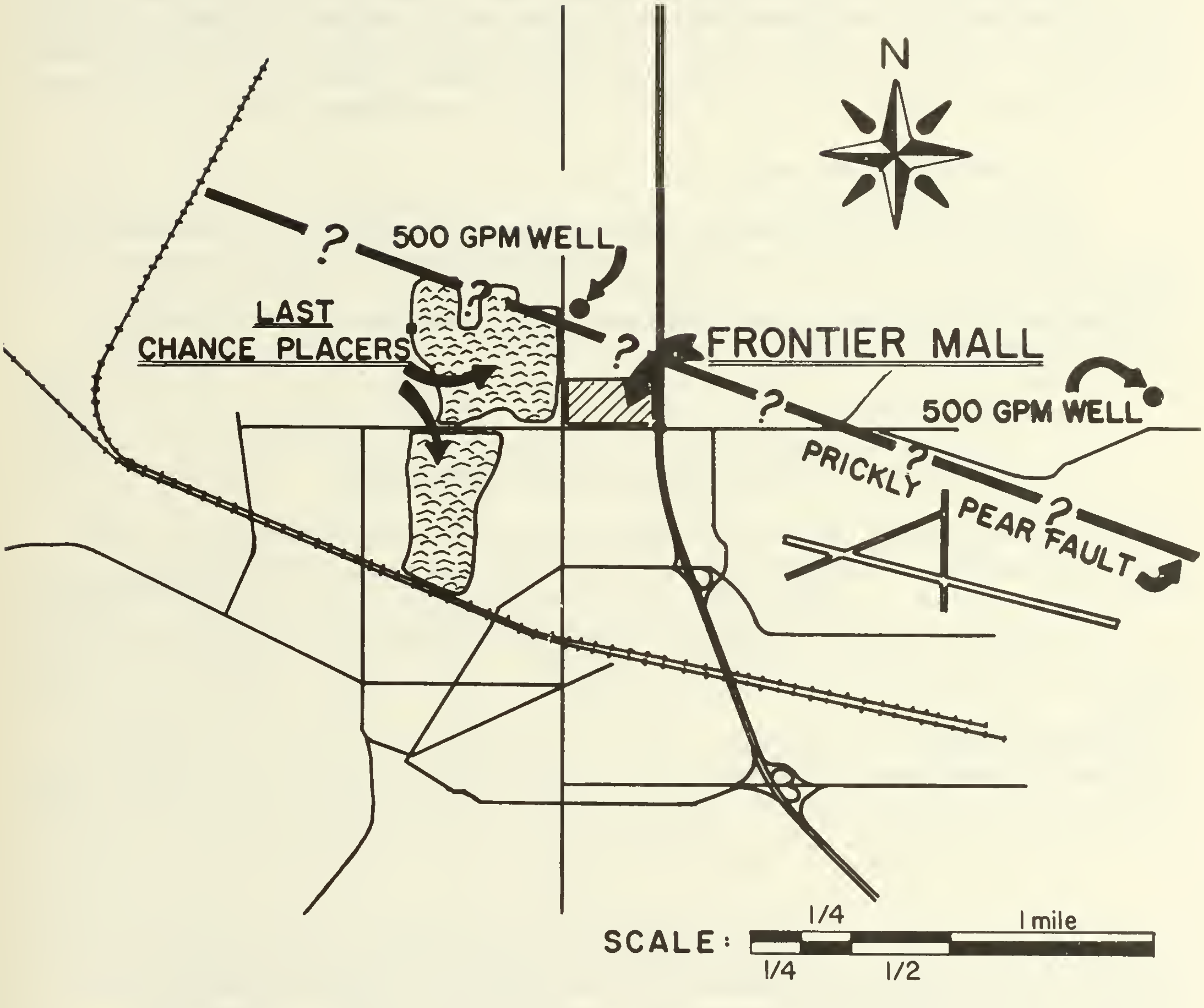

FIGURE II-9.--Geology of the Helena Valley.
Source: adapted from City of Helena, 1978.

primarily of fine-grained volcanic, lake, and swamp sediments, and fine-to-coarse-grained stream and river sediments. These various deposits overlap and interfinger, often changing over short lateral and vertical distances. These sediments were probably deposited in a basin that closely resembled the present Helena Valley (City of Helena, 1978).

The mall site is just outside the projected limits of the Prickly Pear Creek alluvial fan sediments of Quaternary age (last 2 million years) which cap much of the Helena Valley farther north and west. Twenty to 30 feet of Last Chance alluvial fan deposits probably exist under the proposed mall site. Those deposits formed where Last Chance Creek left the confines of Last Chance Gulch and spread out over the broad Prickly Pear Valley.

2. Earthquake Hazards

Helena is located along the Intermountain Seismic Belt, a zone of earthquake activity which extends from Nevada through Utah, Yellowstone Park, Three Forks, Helena, Helmville, and Kalispell. Helena is in an active part of this zone, and has experienced five episodes of damaging earthquakes (table II-17).

TABLE II-17.--Earthquakes in the Helena area

[Source: Montana Department of Natural Resources and Conservation, 1979]

Date	Felt Area (mi^2)	Maximum Intensity	Magnitude
1869	?	V	?
1872	?	VI	?
October 18, 1935	230,000	VIII	6.25
October 31, 1935	140,000	VIII	6
1945			4.5

The Prickly Pear Fault probably was responsible for the two earthquakes that occurred in Helena during 1935 (Scott, 1936, in Montana Department of Natural Resources and Conservation, 1979). A total of 2,280 recorded earthquakes occurred in the 15-month period following the onset of the 1935 swarm. (Swarms are groupings of earthquakes usually related to stress release along one or more faults.) The exact location of the major 1935 earthquakes is not known, but probably was to the north within 4 miles of Helena.

Data from the University of Montana Earthquake Research Laboratory and from other investigations indicate abundant present day earthquakes northwest and southeast of Helena. Both the Prickly Pear and Scratch

Gravel Hills faults are active, but have not exhibited recent displacements. According to Montana Department of Natural Resources and Conservation, (1979), "The Helena region probably is the most likely in the state to have an earthquake that could damage a large number of buildings." During the 1935 Helena earthquake swarm, more than half of the city's buildings were damaged (Neumann, 1937). Although there was no evidence of surface faulting, ground cracks occurred within the city and 10 km (6 mi) northeast of Helena. At the latter site, water carrying sand issued from the cracks. Minor evidence was observed of permanent ground deformation (waves in the streets) and of changes in ground water flow within 20 km (12 mi) of Helena.

3. Mineral Potential

Gold-rich deposits are located under the proposed mall site. The 71-acre mall site could produce up to about $12.5 million of gold at $500/ounce, but the cost of the mining operations to extract that gold would consume most or all of that amount.

The Last Chance Placer dredging operation, which operated from 1935 to 1942 and again from 1945 to 1950, extensively worked the Last Chance Creek gravels west of Montana Avenue (see fig. II-9). This operation used a floating dredge to mine an average of 7000 cubic yards/day of material and produced approximately $0.25 to $0.30 of gold/cubic yard at $35/troy ounce. This amounts to about .007 to .0087 troy ounces/yd.^{3}

Test wells drilled near the old orphanage, now the proposed mall site, yielded "paydirt" in economic quantities at $35/ounce (Wilbur Criswell, Montana Department of State Lands, oral commun., 1980). The company operating the dredging operation considered mining this area, but the operation did not appear feasible when the relatively small amount of low-grade deposits were compared to the costs of extraction.

The same gold-bearing deposits may exist under the mall site as were mined at the Last Chance Placer diggings. The mall site may have up to $12.5 million worth of gold under it, using the following assumptions:

- Average depth of Last Chance gravels is 30 feet (10 yards).
- All 71 acres would be mined (343,640 square yards).
- Average gold content of deposits = 0.007 ounces gold/cubic yard.
- Gold is priced at $500/ounce.

Because the gold-bearing deposits may not cover the entire mall site and may not be as concentrated as the Last Chance Placer diggings, the amount of recoverable gold may be substantially less than $12.5 million. A detailed feasibility study would have to be conducted to determine if the gold could economically be mined. The expense of producing the gold could range from $10 million to well over the value of the gold under the mall site. If the price of gold increases substantially, the economics of such a venture may become more favorable.

The potential for oil and gas at the mall site is unknown, but Helena is within the Rocky Mountain Overthrust Belt which is producing large quantities of natural gas in Canada, and oil and gas in Wyoming, Utah, and Idaho.

The Helena Valley may contain isolated deposits of coal, but these deposits probably are not extensive enough to be economically recovered.

N. HYDROLOGY

1. Surface Water

A natural grass-lined drainage swale traverses the eastern half of the proposed mall site. This swale transports runoff primarily from the northern extreme of Helena's east side. The drainage area for this swale is bounded by Cedar Street on the south, Custer Avenue on the north, Villard Street on the west, and approximately by Roberts Street on the east (see fig. II-1).

Runoff from west of Montana Ave. drains northward along the western barrow pit of Montana Avenue. A 24-inch culvert carries runoff eastward under Montana Ave. along the south side of Custer. Roughly one-third of the distance between Montana Ave. and Interstate I-15, another 24-inch culvert directs runoff northward under Custer Ave. onto the proposed mall site.

Runoff that reaches the mall site from the residential and commerical districts of the northeast side of Helena initially fills the low areas of the mall site along Custer, and eventually flows northeastward across the site. Interstate I-15 was constructed across the natural pathway of this swale. Runoff leaving the proposed mall site is presently directed to the north. It continues along the I-15 roadside ditch until it empties into the Helena Valley Canal (see figure II-1).

The City of Helena Master Storm Drainage Plan calls for additional runoff to be diverted through the mall site. During a 100-year storm, up to 100 cubic feet per second (cfs) of runoff would be directed toward the site from the existing detention ponds northeast of K-Mart. The excess runoff from those detention ponds presently drains into the I-15 roadside ditch.

The 24-inch culvert under Custer Avenue would restrict the amount of flow onto the site to about 50 cfs. The excess would be impounded behind Custer Avenue and would eventually flow eastward to the I-15 roadside ditch. If the City's Master Plan were to be implemented--which would require a larger culvert--the runoff crossing the proposed mall site could exceed 400 cfs (Stahly Engineering and Associates, written commun., December 10, 1979).

There is a problem with the present manner in which runoff is handled for most of the eastern half of Helena. Excess runoff from the proposed mall site and for much of the Davis Gulch, Capital Basin, and I-15 drainages ends up in the Helena Valley Canal. The excess runoff--as much as 70-80 cfs--is removed from the canal by diverting the excess into Ten Mile Creek. Several residents along Ten Mile Creek have voiced their opposition to this practice with the Helena Valley Irrigation District (Ron Schofield, oral commmun., March 26, 1980). This situation is common in urban areas, but has yet to be resolved in Helena.

2. Ground Water

Ground water levels under the mall site are probably fairly shallow: 30-35 feet (U.S. Department of the Interior, 1973). Localized high ground water levels indicated by Villy soils in the northern part of the mall site (see Soils and Vegetation) may be caused by an impermeable layer such as clay that holds infiltrated water near the surface as a perched water table.

Wells capable of producing large amounts of water exist to the north of the mall site (see fig. II-9). The site itself may be be capable of producing at least several hundred gallons/minute. Water quality in the Helena Valley is generally good and is acceptable for normal water uses (Joe Moreland, U.S. Geological Survey, Helena, oral commun., March 1980).

O. SOILS AND VEGETATION

1. Soils

The soils within the proposed development site are made up of three units: Musselshell-Crago complex (20 percent), Villy silt loam (20 percent), and Thess loam (60 percent) (U.S. Department of Agriculture, Soil Conservation Service, unpublished soil survey, Lewis and Clark County Area). (See fig. II-10.) Slopes at the site range from 0 to 5 percent. The Musselshell-Crago unit is located along most of the Montana Avenue frontage. The Musselshell soil is deep, well drained, and has a profile which ranges from a loam at the surface to a very gravelly sandy loam below 34 inches. The Crago soil is deep, well drained, and has a profile which ranges from gravelly loam at the surface to extremely gravelly sandy loam below 32 inches.

The Villy silt loam unit is along Custer Avenue, east from Montana Avenue along about half the property length. The Villy soil is deep, poorly drained, and has a profile which ranges from a silt loam at the surface to a loam below 50 inches. This soil has a seasonally high water table which is near the surface to a depth of 36 inches during most of the growing season.

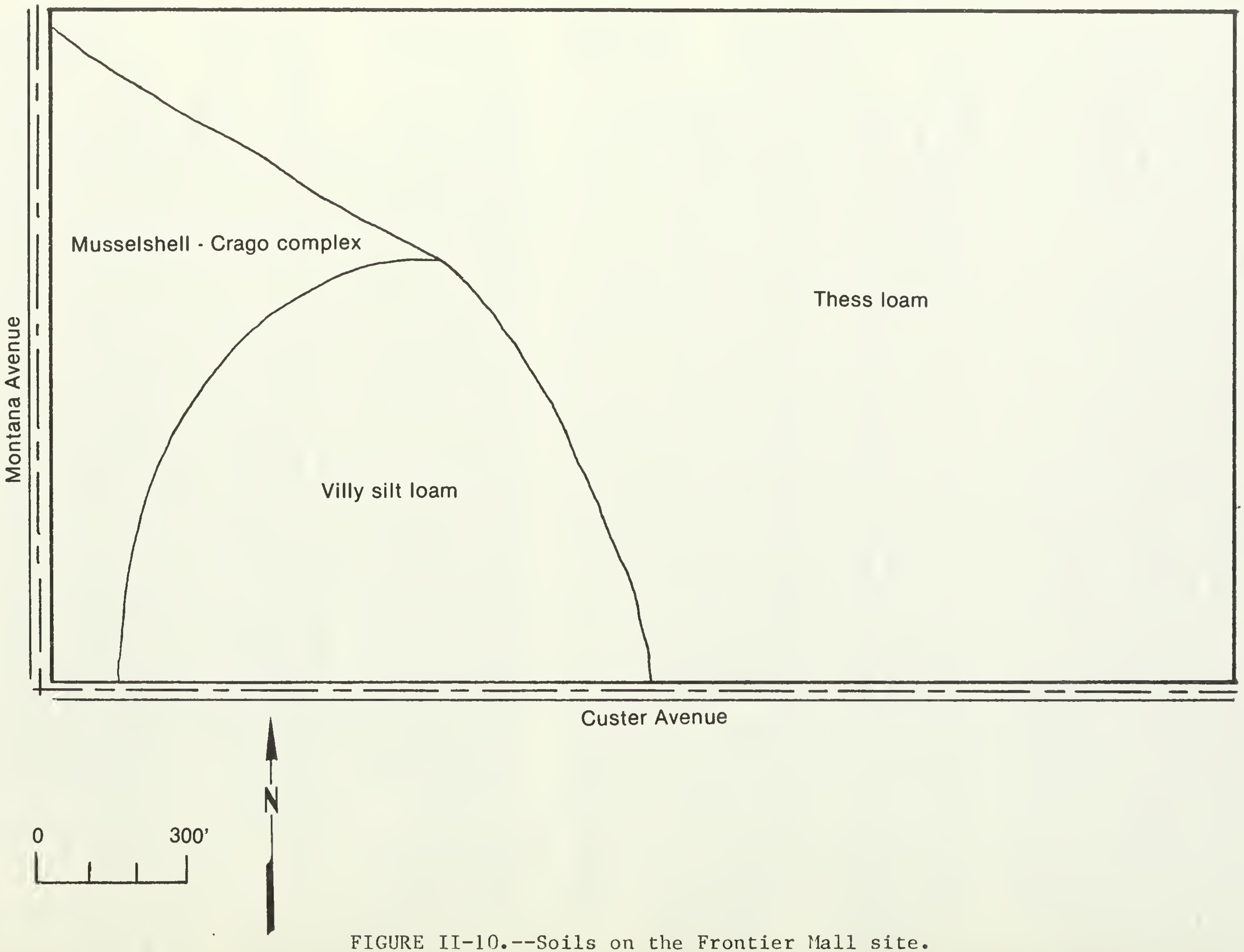

FIGURE II-10.--Soils on the Frontier Mall site.

The Thess loam unit covers the remaining property area. The Thess soil is deep, well drained, and has a profile which ranges from a loam at the surface to an extremely gravelly sand below 25 inches.

2. Vegetation

There are two major types of vegetation on the proposed development site. The first type consists of native range vegetation in fair to poor condition (54 percent of the site). Typical species include blue grama grass, prickly pear cactus, sageworts, and western wheatgrass. The remaining vegetation consists of crested wheatgrass in fair to excellent condition (46 percent of the site). The crested wheatgrass is not native to the United States, and was therefore seeded at one or more times in the past. A brief survey of the area did not disclose any endangered plant species.

At present, the carrying capacity of the proposed development site is approximately 40 animal unit months (AUM's). The potential carrying capacity for the site is approximately 70 AUM's (Michael Carlson, U.S. Soil Conservation Service, Helena, oral commun., 1980). This means that the site has the capacity to produce enough grazable forage to sustain 70 cow-calf units in a 1-month grazing period, or 7 cow-calf units for a 10-month grazing period. Assuming good grazing management and a 10-month grazing period, the site has the potential of producing about 3500 pounds of beef/year. This figure is based on a projected carrying capacity of 70 AUM's; actual AUM's will vary from year to year in response to precipitation and grazing management.

P. WILDLIFE

The Frontier Mall site does not appear to contain important habitat for wildlife; however, the Department of Fish, Wildlife, and Parks has not examined the site in detail. A variety of small mammals, birds, and small life forms use the area, but none unusual for the Helena Valley were observed by team members visiting the area. No big game animals are known to use the area. Game birds may make occasional use of the site; none were observed in several visits there. No raptors or raptor nests were observed in the trees on the mall site. No threatened, endangered, or unusual species are known to use the site.

CHAPTER III

IMPACTS OF THE PROPOSAL

A. LAND USE

1. Primary Impacts

Frontier Mall would not cause major land use changes along the principal arterials leading to the mall site. Growth induced by the mall would intensify the strip-type commercial development now taking place along North Montana Avenue and Custer Avenue. The mall site has been zoned for commercial use and annexed to the City of Helena.

The mall site would change from undeveloped open space to commercial use on 39 acres at the northeast corner of the Montana-Custer intersection. Another 32 acres east of the corner parcel would be converted from a homesite and grazing pasture to commercial use.

2. Secondary Impacts

The increased traffic due to Frontier Mall would spur more commercial development along Custer Avenue west of the Custer-Montana intersection, particularly on the remaining vacant area on the north side of Custer Avenue. The land bordering Custer Avenue east of Northgate Plaza would probably change from vacant to commercial use as far east as Interstate I-15. Land adjacent to North Montana Avenue south of Custer Avenue would probably also fill in with commerical enterprises that rely on heavy traffic flow, such as fast food outlets, freestanding discount stores, automobile service stations, and other types of retail stores. The value of the low-density commercial land near the mall would increase.

Owing to the limited land available, commercial development would not likely occur very far to the north of the mall site on North Montana and east on Custer. The land directly north of the mall site is owned by the Resurrection Cemetery Society and is being held for expansion of the cemetery. The cemetery and existing residential development would form a buffer zone sufficiently large to discourage "leapfrog" development along North Montana Avenue. The old dredge tailings west of the mall across Montana Avenue would not be available for development in the near future. Commercial use of Custer Avenue east of Interstate I-15 would be limited by the airport and the sewage treatment plant.

Land use in the remainder of the West Helena Valley (that portion of the Helena Valley west of Interstate I-15) would not likely be affected by the proposed shopping mall because of the buffer zone formed by the cemetery and residential development. The trend toward more residential development in the valley is expected to continue with or without the mall, owing largely to the lower costs of land and greater availability of financing than in the city.

The central business district in downtown Helena would probably continue to have the present mix of commercial, office, finance, residential, and public uses. Some retail businesses would probably relocate to Frontier Mall; others may possibly close (see Retail Trade); this would not change land use in Helena's existing retail centers.

The changes in land use due to the mall are not expected to adversely affect any residential areas because none are close to the mall site.

B. RETAIL TRADE

Frontier Mall would capture approximately 40 percent of the projected market for comparison goods in the Helena area. Most of the mall's business would come from a significant redistribution of retail sales from existing major shopping areas to Frontier Mall.[1] A relatively small portion of the mall's business would be in the form of retail sales now being lost to other Montana cities. The mall would increase Helena's existing mall space to 454,000 square feet--significantly higher than any of the cities listed in table II-5.

The downtown, Capital Hill, Lundy, Hustad, Cedar, and Northgate retail areas are expected to initially lose an average of 38 percent of their sales. This average sales loss may not apply equally to each area; some may lose more than 38 percent and some may lose less. Within 1 decade, however, Frontier Mall's capture rate (its share of the market) would fall to about 32 percent of the total, as existing shopping areas expanded or otherwise recovered their losses. Some vacancies created by the mall would later be filled in by new businesses or expansions of existing businesses. About 25 percent of the business at Frontier Mall would relocate there from existing retail areas, resulting in approximately 60,000 to 80,000 square feet of vacant space which is currently occupied.

Although the addition of Frontier Mall would mostly result in a redistribution of trade between competing Helena shopping areas, the mall would add about 4 percent--about $2 million--to total trade in the Helena region, primarily as a result of a reduction in external leakages (sales losses to other cities). Frontier Mall is expected to capture the reduction in sales now lost to other cities. The redistribution of trade from existing Helena shopping areas, plus Frontier's capture of part of the external sales losses, is expected to give Frontier Mall a projected 40 percent share of Helena's slightly expanded retail market for comparison goods.

No reliable information on the existing mix of retail stores likely to relocate is available.

Figure III-1 illustrates the impact on sales predicted by the computer-assisted simulation.

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[1] Figure II-4 shows the retail shopping areas identified in this analysis. Some of those areas are identified by the shopping center they include; however, they also include additional businesses.

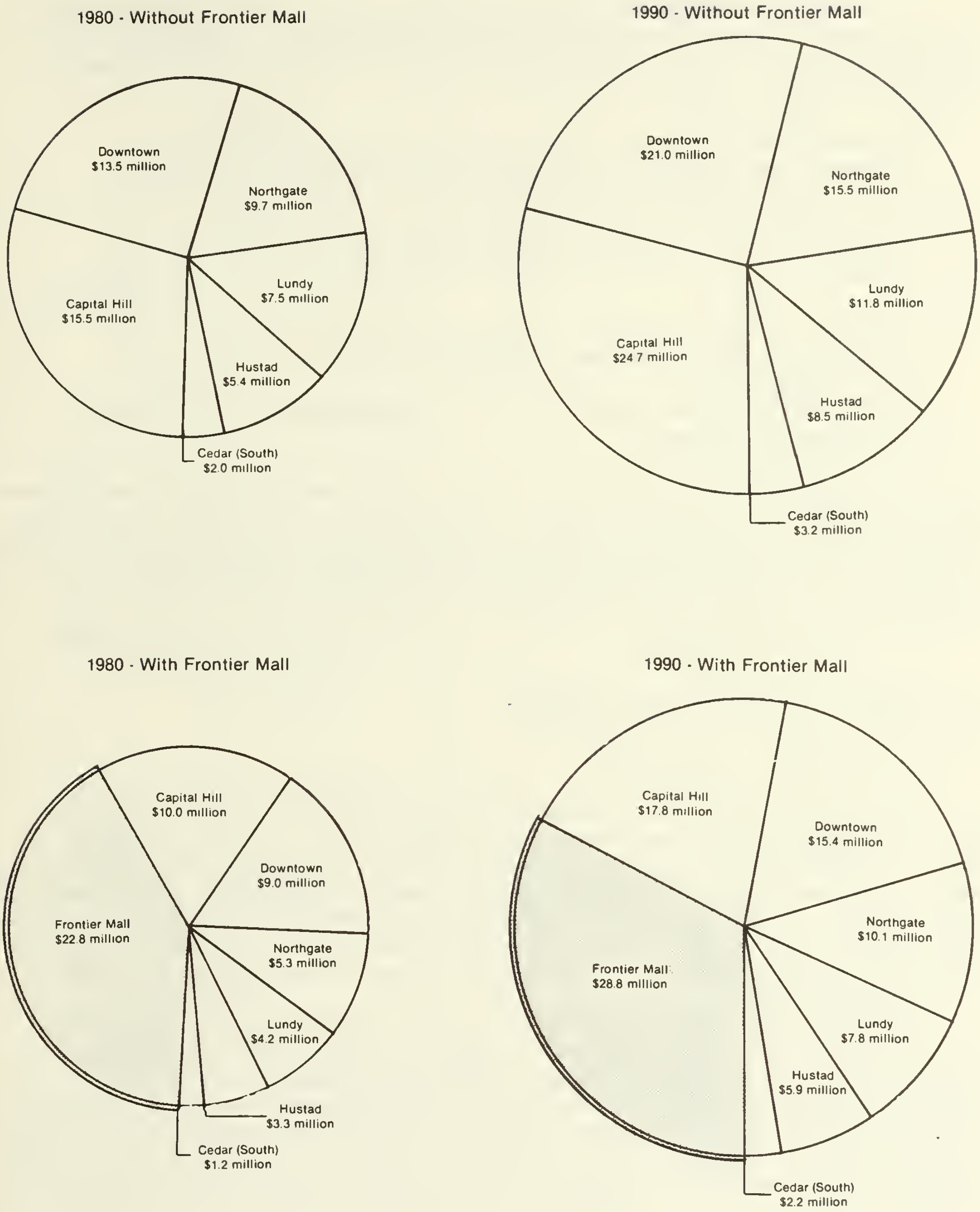

FIGURE III-1.--Estimated retail sales in Helena by major retail area. Arc segment on lower pie charts represents external sales losses captured by Frontier Mall.

A complete description of the computer modeling methodology used to project retail trade is on file with the Department of Highways. The model, a market potential simulation system, is based on the following assumptions:

- The proportion of consumers patronizing a given center varies inversely with distance and travel time, including parking.
- The proportion of consumers patronizing a given center varies directly with the range of goods and services offered by each center.
- The distances that consumers travel to various centers vary for different types of product purchases.
- The attraction of any given center is influenced by the proximity of competing centers.

The modeling also assumes that other major shopping locations do not significantly increase their size. Any additions to the existing centers would lower Frontier Mall's projected capture rate and reduce the relocation of sales. If the Capital Hill mall expansion were to take place as proposed, for example, the relocation of trade from other centers would increase and the relocation from the Capital Hill area would decrease.

C. COMMUNITY SERVICES AND FINANCING

1. Summary

Services directly and indirectly required as a result of Frontier Mall are projected to cost the City of Helena annually about $25,000 more than the city would receive from the mall. Owing to the method used to estimate costs, the deficit could well be less than projected. Projected surpluses are about $25,000 and $34,000 respectively for local High School District No. 1 and Elementary Districts 1, 2, and 3. The county-wide school foundation levy would raise an additional $74,000.

Figure III-2 summarizes projected costs and revenues attributable to Frontier Mall. Both costs and revenues are based on fiscal year (FY) 1978-1979 budgets and mill levies. Costs of providing water, sewer, police, fire, and sanitation services were estimated by deriving a current average cost of providing those services, and then projecting costs based on assumptions regarding future services required by Frontier Mall. This "average cost" method is similar to that used by King County, Washington (1979).

The City of Helena general fund would incur an initial deficit of about $12,000. Surpluses would exist in the water, sewer, and building departments. Water and sewer surpluses would likely be used to reduce the accumulated deficit, not user rates. The building department fee

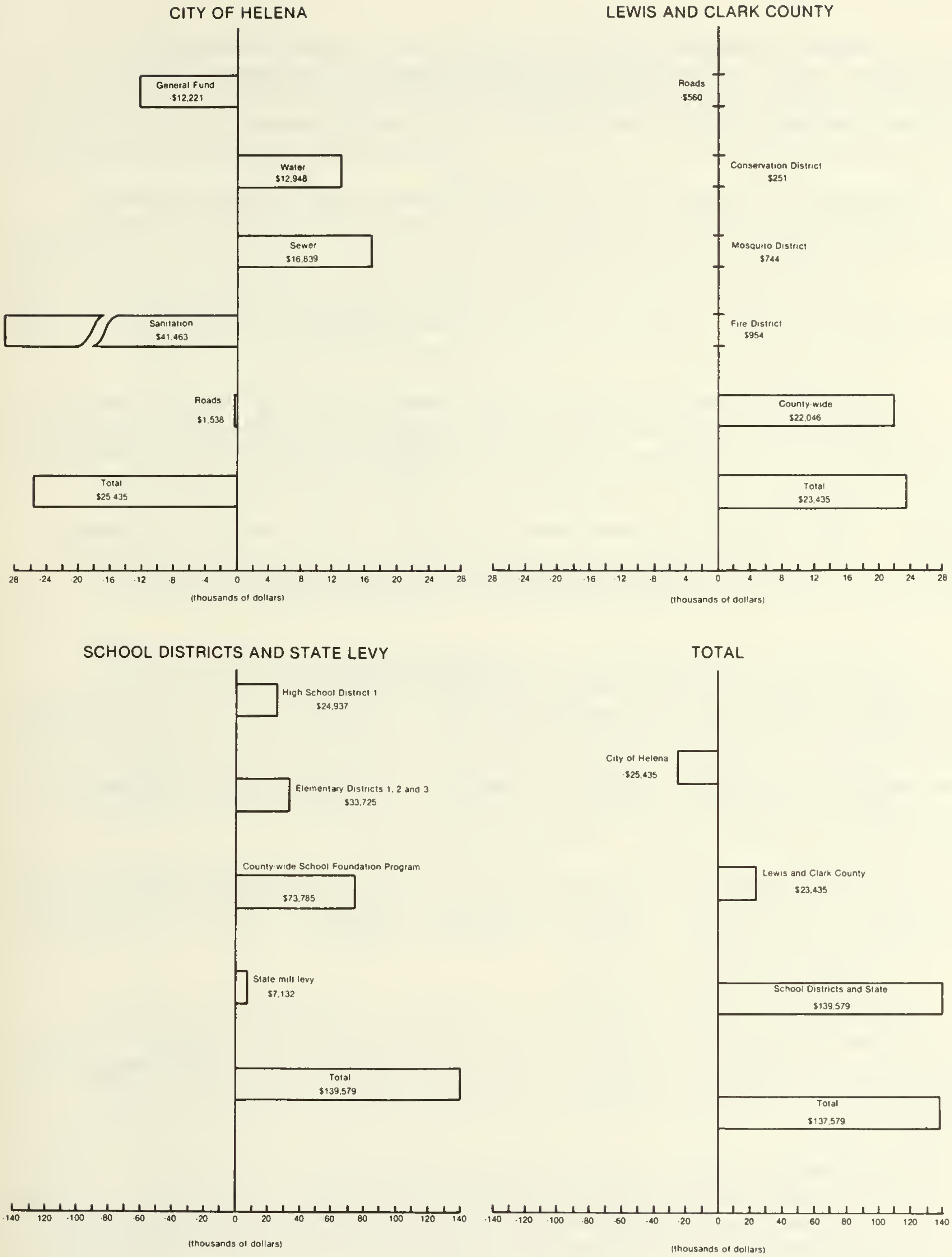

FIGURE III-2.--Projected net costs (left-facing bars) and net revenues (right-facing bars) attributable to Frontier Mall.

schedule may be designed to generate surpluses in large projects and deficits on small projects, which would explain the net impact. The projected sanitation department deficit is a high estimate; if, for example, the deficit were one-third of the projected amount, costs and revenues to the City of Helena due to the mall would approximately balance.

Revenues accruing to Lewis and Clark County would exceed costs by roughly $22,000. This is to be expected since the county would provide few, if any, services to the mall.

Local school districts are projected to receive more in revenues than they will have to expend, due to the revenues received from the mall and from revenues produced by the induced population increase.

Additional information on costs and revenues and the methodology used to project them is contained in the consultant's report that serves as the basis for these fiscal projections (Western Analysis, 1980--report on file with the Department of Highways). That report also projected costs and revenues under a scenario of no annexation to the City of Helena. Those projections were made before the city's decision to annex the mall site. Had the mall site not been annexed, the city would have had a slight surplus--about $1,400--and the county a deficit of about $24,000.

Annexation of the property may set a precedent for annexing future development sites north and west of the mall. If this were to happen, the emerging higher-density land uses would be more scattered than at present, possibly resulting in higher costs of service to the city. The redistribution of retail trade due to the mall is projected to cause some vacated retail space initially (see Retail Trade); if this property is not reoccupied it will reduce the property's taxable value and hence revenues to the city, county, and school districts.

The following detailed projections of costs and revenues due to Frontier Mall are based on a report by Western Analysis (1980).

2. Primary Impact--Revenues

Property tax revenues accruing to the City of Helena are projected to be between $46,600 and $59,500 at 1978-79 mill levies, depending largely on the assessed (full) value of the building when it is completed. Those taxes are shown in Table III-1 and are based on three principal assumptions:

- that the market value of the building after completion is $11.7 million--equal to the "hard" construction cost;
- that the assessed value of the mall will be between 50 and 70 percent of market value;
- that personal property (business) taxes per square foot will average 90 cents per square foot taxable valuation.

All of the revenues collected by the city will be net increases because before annexation the property was not taxed by the city. Net increases in revenues to the county, school districts, and State will be roughly 90 percent of that shown above because the current assessed value of the land is approximately $56,000.

A recent State Tax Appeals Board ruling could result in a 34 percent reduction in assessments on commercial property statewide. Many commercial establishments have had their assessments reduced by 34 percent. If this ruling is eventually upheld, and if Frontier Mall applies for a reduction, the projected real property taxes shown in Table III-1 would be reduced by 34 percent.

The City of Helena would receive additional revenues through user fees such as those associated with building, plumbing and electrical inspections, water and sewer charges, and sanitation fees. Table III-2 shows expected fees, assuming the mall is fully occupied.

TABLE III-1.--Projected property taxes that would be paid by Frontier Mall, assuming the 1978-79 mill levy

	Real Property			Total[2]	
Recipient	@ 50% of Market	@ 70% of Market	Personal[1] Property	Low	High
City of Helena	$32,160	$45,024	$14,472	$46,600 to	$59,500
Lewis and Clark County	23,755	33,257	10,690	34,400 to	43,950
			@ 90% =	30,960 to	39,560
School Districts					
Elem. Dist. 1	31,660	44,324	14,247	45,910 to	58,570
H.S. Dist. 1	21,150	29,610	9,518	30,670 to	39,130
County-wide	31,820	44,548	14,319	46,140 to	58,870
			Total	$122,720 to	156,570
			@ 90% =	110,450 to	140,910
State 7-mill levy	3,500	4,900	1,680	5,180 to	6,580
			@ 90% =	4,662 to	5,922

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[1] Assumes that 25 percent of square footage is leased by businesses that have relocated from elsewhere in the Helena area, thereby reducing net increase in projected taxable valuation of personal (business) property from $300,000 to $225,000.

[2] May not add due to rounding.

TABLE III-2.--Projected user fees due to Frontier Mall, assuming current fee schedules

Department Receiving Fee	Initial Charge	Annual Fee
Building	\$60,773(1)	-
Water	-	\$20,808(2)
Sewer	12,900(3)	18,792(4)
Sanitation	-	17,677(5)

[1] Based on 1978-79 ratio of \$1 in fees to \$181 of reported valuation, and a reported valuation of \$11,000,000.

[2] Based on consumption of 18,000 gallons per day.

[3] Based on a connection fee of \$300 per acre, and 43 acres.

[4] Based on water usage.

[5] Based on current charges at Capital Hill, adjusted upward in relationship to square footage.

The projected net increase in revenues accruing to other local taxing jurisdictions would be 90 percent of the amounts shown in table III-1 because the land currently contributes some taxable value to those jurisdictions. Lewis and Clark County would receive between \$30,960 and \$39,560 annually, School District No. 1 between \$110,450 and \$140,910, and the State of Montana between \$4,680 and \$5,940.

3. Primary Expenses

a. Water

Capital improvements to the water supply system necessary to generate recommended fire flows would cost about \$306,000 (table III-3). This figure differs from the \$194,000 estimated by the City of Helena because the city does not include the cost of installing the 12-inch water main along the north and south boundaries of the mall site. Currently, fire flows at the single hydrant at the site are 236 gallons per minute (GPM), and at Northgate about 1,000 to 1,700 GPM. Minimum fire flows for a fully sprinklered structure the size of Frontier Mall would be between 2,000 and 2,500 GPM. This appears reasonable given the City of Helena's recommendation that the proposed Northgate Mall have fire flows of 1,500-1,800 GPM and the fact that Frontier Mall has 36 percent more

TABLE III-3.--Recommended water system capital improvements (current dollar costs)

Item	Projected Cost
1. Install 12" main along western and northern boundaries of property; 3,800 feet @ $30/foot[1]	$ 114,000
2. Extend 12" main along North Montana from south of Circus Twin Theatre to Poplar	137,000(2)
3. Extend 12" main on Roberts from Poplar to Helena Avenue	40,000(2)
4. Install 10 fire hydrants	15,000(3)
Total	$ 306,000
Optional	
5. Extend 12" main from S.E. corner of property to Helena Airport	$ 308,000(4)

[1] Estimated cost per foot supplied by city and consulting engineers.

[2] Estimate made by Morrison-Maierle in 1978 Water System Master Plan; adjusted for inflation.

[3] Cost estimate supplied by City of Helena, Water Department.

[4] Estimate made by Water Department, City of Helena, for Northgate expansion, May, 1979; adjusted for inflation.

square footage than Northgate. According to the consulting engineers for the Helena water system master plan, improvements 1-4 on table III-3 would result in fire flows at the property of about 2,600 GPM (Tim Berry, Morrison-Maierle, Inc., oral commun., December 21, 1979).

Item 5 on table III-3 was an option, in lieu of items 2 and 3, presented in the city staff's memorandum regarding the proposed Northgate Mall. It is not likely that this option will be pursued because of its cost, and because the other improvements would supply sufficent fire flows. However, city regulations allow for a developer to recover costs of water system improvements from future tie-ins within 10 years on immediately adjacent property. Thus optional item 5 would allow for this possible recapture of investment, while items 2 and 3 would not.

Table III-4 shows projected annual operating expenses of $7,860. Existing city policy is to reimburse developers for costs of the mains and appurtenances above 8" diameter. It is assumed that the ratio of these costs to total costs estimated by city staff for the Northgate proposal (17 percent) will apply to Frontier Mall. The most feasible way for the city to finance the $52,000 is to include it in the revenue bonds required to be sold to finance the entire Phase I water system improvements.

Operation and maintenance expenses have been projected by, first, calculating the ratio of Frontier Mall water consumption, estimated by Developers Diversified at 18,000 gallons per day, to current total city water sales, 1,350 million gallons per year. The ratio is .005. Multiplying this by the FY 1979 water department maintenance and operating budget of $492,056 reveals that this pro-rata share of water sales results in about $2,460 per year in expenses.

Frontier Mall may also make more urgent the need to construct the Tenmile sedimentation basin which, according to the Morrison-Maierle water study, is needed to increase the storage capacity in the Malben-Woolston portion of the city water system.

TABLE III-4.--Projected annual operating expenses of the water system

Item	Projected expense
1. Debt service on city share of capital improvements $52,000 @ 8-1/2 % for 20 years[1]	$ 5,400
2. Operation and maintenance	2,460(2)
Total	$ 7,860

[1] Based on 17% of $306,000 in total capital improvements.

[2] Based on pro rata share of the water department's FY 79 operating budget.

b. Sanitary Sewer

Sewer expenses associated with hooking up to the city's main outfall line to the Wastewater Treatment Plant, which traverses the southern edge of the property along Custer Avenue, will be minimal. Western Analysis estimates the maximum costs to the city of tapping into the line and adjusting the height of the six manhole covers to be roughly $2,000.

Annual operating expenses are projected to be about $1,890. This number is derived by using the same procedure used for estimating annual operating costs for the water department. Assuming an effluent generation rate of 18,000 gallons per day (6.57 million gallons per year), Frontier Mall will contribute an additional 0.5 percent to the average amount of sewage processed daily (3.52 million gallons) by the city. A 0.5 percent pro rata share of the sewer department FY 1979 non-administrative operating budget of $377,384 results in projected costs of $1,890.

According to Dick Nisbet, Director of Public Utilities, there is currently sufficient excess capacity in the main outfall line to carry the additional effluent generated by the mall. The wastewater treatment plant is currently operating at about 60 percent of its capacity of 6.5 million gallons per day.

c. Fire

Projected annual expenses to the fire department are estimated at $33,480. In addition, one man-month of time would be required to perform the initial inspection of the building necessary to familiarize the staff with the structure, costing an additional $1,400.

The procedure used to estimate costs is shown in Table III-5. Steps 1 and 2 prorate three-fourths of the FY 1979 operating budget (less the medical levy) across the department's annual responses to determine an average cost per response. It is felt that the three-fourths ratio in Step 2 is fair since the fire department is involved in several programs, such as public education, training, inspection, and maintenance, which are not related to their capacity for responding to alarms or investigating fires.

Steps 3 and 4 show the total number of responses and commercial calls as reported by the fire department. The remaining steps project the expected number of calls from Frontier Mall, based on its share of current commercial square footage, and apply the current cost per response to this number. Costs for the necessary annual inspection are added to this figure to arrive at $33,479.

This cost projection assumes full staffing; according to the fire department, they are currently understaffed. Helena has one fire fighter per 1000 population, while the national average is 1.62. In the event of a major fire, Helena does not have enough manpower to properly cover additional simultaneous fires. (Norm Gray, Helena Fire Department, oral commun., December 14, 1979).

d. Police

The Helena Police Department is projected to incur $14,267 per year in annual costs associated with Frontier Mall. This assumes that no additional personnel or equipment will be required to routinely patrol the mall site. Police Chief Williams has indicated that the necessary

TABLE III-5.--Fire Department operating budget, responses, and steps used to project costs

	Step		
1.	FY 1979 Budget	$ 453,061	
2.	X 0.75	$ 339,796	
3.	Total annual responses(1)	540	
4.	Responses attributable to commercial property	168	
5.	Average cost per response	$339,796/540 = $ 629	
6.	Projected calls from Frontier Mall	.306(2) X 168 = 51	
7.	Projected cost prorated for 51 calls	$629 X 51 =	$32,079
8.	Annual inspection (One man-month)		1,400
		Total	$33,479

[1] Responses for period 1/1/79 to 12/5/79, adjusted up for one year.

[2] Frontier Mall will add 30.6 percent of commercial square footage to Helena, assuming current square footage is 1,263,000 as reported by the Lewis and Clark A.P.O.

preventive patrol duties at that site can be handled within existing personnel and patrol duties (oral commun., December 17, 1979).

Table III-6 lists the steps followed to arrive at the projected annual costs. A major assumption is found in step 2, where it is assumed that one-half the total operating budget can be attributed to their capacity to respond to calls and follow up investigations. Step 5 projects calls attributable to Frontier Mall, based on current experience at Capital Hill adjusted up due to mall size differences. Step 6 is another major assumption and accounts for the fact that there is not a direct 1:1 relationship between local crime rates and retail square footage. It is assumed that half the projected calls can be attributed simply to relocated criminal incidents, thereby resulting in net new calls equal to one-half of total calls.

TABLE III-6.--Police Department operating budget, annual calls and steps used to project cost

1.	Total operating budget		$ 650,017(1)	
2.	X 0.5		$ 325,000	
3.	Total estimated annual calls		14,400(2)	
4.	Calls from Capital Hill during September, 1978		17(3)	
5.	Projected yearly calls attributable to Frontier Mall	48 X 12 =	576	
6.	X 0.5		288	
7.	Average cost per call	$325,000 / 14,400 =	$22.60	
8.	Projected costs due to calls from Frontier Mall		288 X $22.60	= $ 6,509
9.	Additional costs	6.4 man-months @ (average)	$1,212/Mo.(4)	= 7,758
			Total	$ 14,267

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[1] Excludes medical levy.

[2] Estimated by Police Department, December 17, 1979.

[3] Total calls less 80% of traffic-related, which is assumed will occur regardless of mall.

[4] Estimated cost for one patrol man-month, based on an estimated patrol-related operating budget of $320,000.

Adding Step 8, the projected costs due to calls from Frontier Mall, to Step 9, patrol time costs assuming two 15-minute patrols between 7:00 a.m. and 9:00 p.m. and three 5-minute patrols per hour at night, results in a total annual cost of $14,267.

e. Sanitation

Costs to the Sanitation Department of collecting and disposing of refuse generated by Frontier Mall are estimated to be $59,140. A major assumption is that Frontier Mall will generate the same amount of refuse per square foot as Capital Hill mall.

Capital Hill tenants produce refuse at the rate of 125 pounds per yard and 35 yards per day (Don Lewis, Helena Sanitation Department, oral commun., Jan. 3, 1980). The resulting 685 tons/year is 4.2 percent of the total refuse collected by the city, and 2.8 percent of the refuse handled by the city landfill.

Nine of the thirteen non-administrative employees of the sanitation department are involved in the collection of solid waste. Applying this ratio to the total non-administrative FY 1979 budget of the department ($560,423) results in prorated costs to the collection and landfill activities as shown in Table III-7. Multiplying these costs by the above ratio results in an estimated $21,123 in costs associated with servicing Capital Hill, and thus $59,144 in projected costs to the city of servicing the larger Frontier Mall.

This figure should be considered a high estimate because it is likely that collection costs per ton of solid waste are relatively less when that refuse is concentrated at one site, such as a large shopping center, as opposed to being spread out, such as is the case with residences.

TABLE III-7.--Sanitation Department annual budget and projected costs

	Collection		Landfill		Total:
Capital Hill	($387,985 X .042)	+	($172,438 X .028)	=	$ 21,123
Frontier Mall	X 2.8(1)			=	$ 59,144

[1] Ratio of Frontier Mall square footage to Capitol Hill square footage.

f. Building

The Building Department is projected to incur a cost of $4,590 in carrying out its inspection duties related to the construction of Frontier Mall. This estimate assumes the inspections schedule and related personnel time shown in table III-8.

Allocating the FY 1979 department budget across five employees gives a cost of $76.50/employee/day. Multiplying this by 60 man-days results in the projected cost of $4,590.

TABLE III-8.--Time required for building inspection

Inspection Item	Man Days
Plans check	10
Ready to pour foundations	3
Finished foundations	3
Open Structural	3
Closed structural	3
Final building inspection	12
Rough-in plumbing	3
Final plumbing	6
Rough-in electrical	3
Final electrical	6
Interim (as needed) inspections	8
Total	60

g. Roads

Approximately $526,000 in street and related improvements would be necessary by about 1985 to accomodate projected traffic loads accompanying Frontier Mall. Similar street improvements would be needed by about 1990 without the mall due to normal traffic increases. The required improvements are discussed under Transportation; table III-9 shows the breakdown of costs for those improvements. The improvements shown in table III-9 would likely be necessary by about 1990 even if the mall were not built (see Transportation).

Both North Montana Avenue and Custer Avenue are part of the local Urban System roads which qualify for Federal aid. The Helena area now receives about $470,000/year in Federal funds for maintenance and improvement to these roads. Priorities for expenditure of the funds are jointly set by the Helena Technical Advisory Committee and Policy

TABLE III-9.--Estimated capital costs for road improvements

[Source: Montana Department of Highways, unpublished analysis]

Improvement	Primary expense	Cost
Surfacing	Widen portion of North Montana to 4 lanes	$183,200
Electrical	Revise and reset equipment at intersection	25,300
Utilities	Relocate power, telephone, and pipelines	143,600
Traffic	New stripings and markings on roadway	76,600
Hydraulics	Minimum improvements for widened roadway	98,000
TOTAL		$526,000

Coordinating Committee. Current stated priorities are for North Main Street and Cruse Avenue in the downtown area. No improvements are currently planned for the intersection at the Frontier Mall site. If the city were to pay for part of the necessary improvements, the current priorities would have to be changed. Similarly, if Federal urban system funds were spent at the Frontier Mall site, other local priorities would have to wait.

Widening of North Montana may encourage increased traffic on the road south to town, thereby exacerbating the already serious strain on North Montana between Cedar and the Helena-Lyndale-intersection. The additional commercial development the mall would encourage along North Montana south of Custer would add to the need for street improvements.

4. Secondary Impact

Frontier Mall would cause secondary impacts associated with population increases attributable to local net employment increase. The following analysis assumes that revenues and operating expenditures for departments charging user fees will be similar and therefore their budgets will be relatively unaffected by small population increases.

A population increase of about 300 can be expected to accompany the net increase in employment provided by the mall. Those people will form 118 new households based on a 1980 household size of 2.57 projected by the Lewis and Clark Areawide Planning Organization. Forty-five new students in grades K-8 and 23 in grades 9-12 are expected, based on the 1978 ratio of students to county population.

The new population is expected to locate evenly between the city and the county.

a. Revenues

The net increase in taxable valuation due to projected population increases would be $334,280, divided equally among city and non-city residents. The projection is based on the following assumptions:

- An average construction cost of $\$35/ft^2$ and an average new household size of 1,400 ft.
- Market value equal to construction cost; assessed value of one-half market value.
- Average valuation of motor vehicles equals $217 per capita.

Table III-10 lists projected revenues from city residents accruing to the various taxing jurisdictions. This includes a projected increase in intergovernmental revenues to the City of Helena amounting to $2,294, which is based on the FY 1979 rate of $14.16 per capita.

Table III-11 shows projected tax revenues accruing to the various jurisdictions from new residents living outside the city limits.

b. Expenses

Projected public costs associated with the population increases due to Frontier Mall are as follows: $11,602 to the City of Helena, $36,355 to Lewis and Clark County, $76,986 to High School District 1, and $97,152 to Elementary Districts 1, 2, and 3. These are derived by multiplying FY 1979 per-capita (pupil) residentially-induced expenditures for the various taxing jurisdictions by the projected increase in population (pupils).

Table III-12 shows City of Helena expenditures by service category. Because the existing local residentially-induced per capita cost should be used as the base, the proportional valuation method was used to derive the share of municipal expenditures attributable to residences. That technique assigns costs based on the relationship of incoming to existing real property values. This method resulted in assigning 66 percent of the costs to residential (as opposed to nonresidential) property.

Table III-13 shows Lewis and Clark County FY 1979 expenditures. Again, the proportional valuation method was used to derive the residentially-induced expenses, which for the county amounted to 77 percent of the total.

Table III-14 shows the derivation of projected costs for the local school districts.

TABLE III-10.--Projected revenues to various recipients due to secondary population increase in Helena

Recipient	Property Taxes	Intergovernmental Revenues[3]	Total[4]
City of Helena	$ 10,750	$ 2,294	$ 13,040
Lewis & Clark County	7,940	-	7,940
School Districts			
Elem. Dist. 1	10,583	26,260(2)	36,840
H.S. Dist. 1	7,070	22,000(2)	29,070
County-wide	10,637	-	10,640
State 7-mill levy	920(1)	-	920

[1] Excludes motor vehicle taxes.

[2] Based on 60 percent of total revenues due to Federal and State funding, and FY 79 per-pupil ratios.

[3] Based on an estimated 1978 city population of 28,500.

[4] May not add due to rounding.

TABLE III-11.--Projected revenues to various recipients due to secondary population increases outside Helena

Recipient	Property Taxes	Intergovernmental Revenues	Total[6]
Lewis & Clark County[1]	$ 12,178	$ 1,160(2)	$ 13,340
School Districts			
H.S. Dist. 1	7,070	22,000(5)	29,070
Elem. Districts 1-3[3]	9,465	26,260(5)	35,725
County-wide	10,637	-	10,640
State 7-mill levy	920(4)	-	920

[1] Includes road fund, conservation districts, average levy for East and West Valley Fire Districts, and mosquito levy.

[2] Based on FY 79 rate of $3.58 per capita; excludes payments in lieu of taxes and Taylor Grazing Act.

[3] Assumes one-half of non-city residents live in District 1, and one-fourth in each of Districts 2 and 3.

[4] Excludes motor vehicle taxes.

[5] Based on 60 percent of total revenues due to Federal and State funding, and FY 1979 per-pupil ratios.

[6] May not add due to rounding.

TABLE III-12.--City of Helena expenditures by service category and projected costs attributable to secondary population increases (based on FY 1979 operating budgets)

Category	Total				Attributable To Residential
Police[1]	$ 705,083				
Fire	478,865				
Recreation and parks [2]	551,447				
Library	164,559				
City Manager, administration[3]	470,282				
Streets	288,382				
Total	$2,658,618	X	.66	=	$1,754,688
Debt service	$637,579	X	.66	=	420,802
					$2,175,490
Operating budget and debt service per capita[4]					$76.33
Projected costs	$76.33	X	152	=	$11,602

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[1] Includes capital outlay, Police Court, and animal control.

[2] Minus fees associated with recreation.

[3] Includes legal services, budget and evaluation, personnel, finance, and rehabilitation.

[4] Assuming 1978 population of 28,500, estimated by Lewis and Clark A.P.O.

TABLE III-13.--Lewis and Clark County expenditures by service category and projected costs attributable to secondary population increases (based on FY 1979 operations budgets)

Category		Total				Attributable To Residential
County-wide		$6,507,639				
Roads		898,927				
East and West Valley Fire Districts		25,100				
Mosquito control		31,991				
Conservation Districts		18,009				
		$7,487,666				
Minus payments in lieu of taxes and fees		1,113,977				
	Total	$6,367,689	X	.77	=	$4,903,121
Operating budget per capita[1]						$119.59
Projected costs		$119.59	X	304	=	$36,355

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[1] Assumes 1978 population of 41,000, estimated by the Bureau of the Census (U.S. Department of Commerce, 1979a).

TABLE III-14.--School districts' expenditures and projected costs attributable to secondary population increases (based on FY 1979 operating budgets)

High School District No. 1			
Operating budget	$7,509,830		
Debt service	423,005		
Pupils (ANB)[1]	2,679		
Cost per pupil			
Operating budget			$ 2,803
Debt service			158
			$ 2,961
Projected cost	$2,961 X 23	=	$68,103
Elementary Districts Nos. 1, 2, 3			
Operating budget	$9,544,173		
Debt service	758,457		
Pupils (ANB)[1]	5,090		
Cost per pupil			
Operating budget			$ 1,875
Debt service			149
			$ 2,024
Projected cost	$2,024 X 45	=	$91,080

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[1] Average number belonging (supplied by County Superintendent of Schools).

D. TRANSPORTATION

1. Summary

Frontier Mall would hasten the need for improvements to maintain traffic flow on North Montana Avenue and Custer Avenue. With the mall, major improvements would be needed by about 1985; without the mall, the improvements would be needed by about 1990. Even with the required improvements, traffic flows on North Montana and Custer Avenues would become congested by 2000, although Frontier Mall would contribute less than one-fourth of the total traffic flows by then.

During construction of the mall, gravel trucks hauling fill across North Montana Avenue to the mall site would impede normal traffic flow under the assumptions presented by the developer.

Gasoline used for transportation is not expected to increase as a result of Frontier Mall. The local increase in gasoline consumption would be entirely offset by a reduction in shopping trips to other cities.

Pedestrian walkways and bicycle lanes would be needed to minimize hazards to those who do not drive to the mall.

2. Traffic Flows

At the time the mall opens, the street and intersection improvements described in chapter II, Transportation, would be needed immediately. Needed improvements include roadway widening, revised signal phasing, and revised signal timing to accomodate heavy turning traffic.

Traffic flows with the mall were analyzed by the Montana Department of Highways' Traffic Unit for 1985, 1990, and 2000. The 1985 analysis generally holds true for the day the mall opens, projected for 1982. Traffic not related to the mall would be lower in 1982 than in 1985; however, traffic due to the mall would also be lower, indicating that the proportion of mall-related traffic to total traffic may be nearly equal from 1982 to 1985.

a. North Montana-Custer intersection

About 4,250 vehicles per day would travel to and from the mall. This estimate is based on a traffic simulation computer model developed by Western Analysis, Inc. (report on file with the Department of Highways). The traffic increase would amount to 36 percent of the 1985 traffic on North Montana Avenue and 33 percent of 1985 traffic on Custer Avenue. These large increases in traffic volume would require some modification of the intersection soon after the mall opens. A second southbound through lane on Montana Avenue would have to be built. Construction of this lane could wait until around 1990 without the mall. A four-lane section north and south of the Custer-Montana intersection would be needed to facilitate through traffic and turns to and from the mall.

The extra lane would be warranted for about 1500 feet north of the intersection and to Cedar Avenue south of the intersection. (See Montana Avenue approach to Frontier Mall, below.) The expanded roadway would be 66 feet wide with a 14 foot median, with curb and gutter on both sides. Costs for the required improvements, including utilities, signals, hydraulics, and road design, are shown in table III-9 (see Community Services and Financing).

The level of service on Custer and North Montana would continue to decline after the improvements were made, becoming slightly congested by 1990. Further major intersection improvments would not be needed until 2000. By then, Montana Avenue would need exclusive approach lanes for right-turning traffic; Custer Avenue would need three approach lanes to isolate traffic moving right, left, and straight through the intersection. A separate signal phase on Custer for left turns onto Montana would also be needed. The improvements would be needed with or without Frontier Mall; the mall would hasten the need for the improvements by a few years.

Even with the improvements needed by the year 2000, the level of service for the intersection would be congested, with considerable delay during peak traffic hours. The problem would be due more to the expansion of population in the Helena Valley than to Frontier Mall. Several long-range solutions to this problem are described in chapter IV, Mitigating Measures.

b. Montana Avenue approach to Frontier Mall

About 200 vehicles/hour are projected to turn right from Montana Avenue into the mall. This volume of traffic could turn right out of the through lane without causing conflict, but a deceleration taper and lane would aid normal flow.

About 100 vehicles/hour would turn left from North Montana Avenue into the mall. This represents 13 percent of the total 1990 traffic southbound on Montana. A designated left turn bay would be needed to avoid impeding through traffic. Because additional lanes would be needed at the intersection, it would be logical to extend the widened section 1500 feet north of the intersection to properly provide for all movements at the north approach to the mall. About 100 feet of left turn storage would be required.

c. Custer Avenue approaches to Frontier Mall

The west entrance to the mall on Custer Avenue would receive much more use than the east entrance. About 200 vehicles/hour are expected to use the west approach, 100 turning left to enter the mall and 100 turning right to depart. The left turning traffic would be 27 percent of the eastbound traffic on Custer by 1990; a 100 foot storage bay would be required to avoid impeding through traffic.

The left turn lane needed on the westbound approach to the Montana-Custer intersection, plus 120 feet of taper, plus 100 feet of mall storage, equals the 600 feet allowed by the developer between Montana Avenue and the west Custer Avenue entrance. Moving the west mall entrance 100 feet or so to the east would allow more flexibility in the design of the approach to the intersection: by the year 2000, a longer westbound left-turn lane may be needed on Custer. Moving the mall entrance east would also help prevent conflict between the proposed Custer Avenue approach to the mall and the existing Custer Avenue access to the Northgate Center. The left turn storage bay and taper needed for the west entrance to the mall (as currently proposed) would conflict with the existing approach to one business in the Northgate Center complex.

Most of the mall traffic westbound on Custer Avenue is expected to turn right into the east entrance to the mall. A deceleration taper and a lane of minimum length would accomodate the heavy traffic turning right from Custer into the east entrance.

Little traffic eastbound on Custer would use the east entrance to the mall; most eastbound traffic would use the west entrance. The left turn approach to the east entrance could operate without protection, but a left turn bay would increase safety and convenience. This would extend the three lane section about 800 feet farther east from the Montana-Custer intersection.

Projected traffic counts do not indicate a need for signals at the approaches to the mall; however, the option should be kept open in the event actual traffic levels show a need for signals.

If Sanders Street is ever extended north to Custer Ave., it would be desirable to plan a common point of intersection with the east entrance to the mall. This would provide direct access to the mall and better traffic control on Custer Ave. Such an intersection would minimize conflicts between turning, weaving, and slow-moving vehicles on Custer Avenue and would aid installation of signals should they become warranted.

Traffic due to the mall, and the street improvements it would require, would conflict little with existing business approaches on Custer Avenue. The widened approach west of the Custer-Montana intersection would begin just east of the entrance to the drive-in theater. Little conflict is expected because most of the traffic to the theater would be in the evening when fewer people would be going to the mall. The conflict with the north entrance to Northgate is discussed above.

3. Fill Material Hauling

The developer of Frontier Mall plans to level the site with gravel fill from the LaSalle gravel pit across Montana Avenue (see Geology). According to the hauling plan prepared by the developer's engineering firm (Stahly Engineering and Associates, written commun., February 14, 1980), the fill will be hauled by 12 trucks, each with 12-cubic-yard capacity. The trucks will be spaced to cross Montana Ave. at 45-second intervals. A loaded truck will cross at the same time an empty truck returns. Each truck will therefore have 9 minutes to load, haul, dump, and return. To eliminate peak-hour traffic conflicts, the trucks will not cross Montana Avenue weekdays between 7:30 a.m. and 8:30 a.m. and between 4:40 p.m. and 5:30 p.m.

The developer projects the time needed to haul the fill as follows:

- Each truck will haul 53 loads/day (8 hours x 60 minutes/hour divided by 9 minutes).
- 53 loads x 12 cubic yards/load x 12 trucks amounts to 7,632 cubic yards of fill hauled each day.
- It will take 23 days to haul 175,000 cubic yards of fill at 7,632 cubic yards/day.

The remaining fill required for the parking areas and landscaping will be hauled on a slower schedule spanning several months.

An average of 636 vehicles/hour pass by the proposed crossing on Montana Ave. between 9:00 a.m. and 4:00 p.m. on weekdays (Lewis and Clark County, 1979). This amounts to about 10 vehicles/minute. The truck crossing schedule with the least possible impact over the 23-day hauling plan would be a loaded truck and an empty truck crossing simultaneously every 45 seconds. From this it is evident that the trucks will interrupt normal traffic on Montana Avenue.

The fill material probably could not be hauled exactly according to the developer's plan, given the likelihood of imperfect coordination and occasional equipment breakdowns. As a result, the disruption of traffic would be greater, or the time needed to complete the hauling would increase.

The impact on traffic from fill hauling could be mitigated by lengthening the projected 23-day hauling period, or by hauling some of the fill at night. The impact could be eliminated, at unknown expense, by constructing a temporary gravel conveyor belt over Montana Avenue. Such a system would require a few trucks to spread the fill, but the trucks would not cross Montana Avenue (see chapter IV, Mitigating Measures).

4. Energy Used In Transportation

The mall would cause at most a 1.5 percent increase in the amount of gasoline used for transportation in the Helena urban area, due to the projected 9 percent increase in the number of shopping trips within Helena with the mall. This increase, however, would be entirely offset by a decrease in the number of trips to shopping centers outside Helena.

If the mall were to open in 1980, it would generate about 8,500 trips/day. Assuming .713 gallons/trip, this represents an annual gasoline consumption rate of 2.2 million gallons. By 1990, the mall would generate about 8,300 trips/day. Assuming an increased average fuel efficiency of .428 gallons/trip, trips to the mall would use 1.3 million gallons of gasoline in 1 year. Without Frontier Mall, most of those trips would be taken to other retail centers in Helena and other cities. The net effect on total gasoline consumption in the Helena urban area is shown in table III-15.

TABLE III-15.--Effect of Frontier Mall on gasoline consumption in Helena urban area

[Data are in gallons. Sources: Boyer, 1979; U.S. Department of Energy, 1979; Western Analysis, 1980]

Date	Estimated use/trip	Projected gasoline consumption without mall	Projected gasoline consumption with mall	Percent increase due to mall
1977	0.753	33,000,000	n.a.	n.a.
1980	.713	33,300,000	33,800,000	1.5
1990	.428	24,600,000	25,000,000	1.6

5. Safety

Nearly all people using Frontier Mall would travel there by car. For those who walk or bicycle, the proposed mall site is not a convenient location. Only 10 percent of the homes in Helena are within 1 mile of the mall site. Less than two percent are within one-half mile.

Safe pedestrian walkways, bicycle paths or lanes, and traffic signals would benefit those who choose not to drive. Access to the mall without such improvements would be dangerous for pedestrians and cyclists. At present, there are no sidewalks, bicycle paths, or bicycle lanes within several blocks of the proposed site.

E. EMPLOYMENT AND INCOME

Frontier Mall would employ about 325 persons full-time and 230 persons part-time--a total of about 440 full-time-equivalent positions. Because 25 percent of the retail space at Frontier Mall is expected to be occupied by businesses relocating from elsewhere in Helena (see Retail Sales), about 25 percent of the jobs at the mall are expected to be relocations. The net employment increase due to the mall, therefore, would be the equivalent of about 330 full-time jobs. Because the relationship between floor area and employment is not 1:1, it is not known to what extent, if any, the net employment increase at the mall would initially be offset by corresponding decreases at Helena's other retail centers.

By 1990, replacement of the vacancies created by relocating businesses is projected to make up for any reduction in employment. See Retail Sales, especially fig. III-1.

By 1982, the additional jobs would increase the personal income in the Helena urban area by about $2.4 million, which is 0.9 percent of the 1977 figure. The increase in personal income would not noticeably increase retail sales in Helena.

F. SOCIOLOGY

The population of the Helena area would not increase significantly due to the proposed mall. An increase of about 300 persons can be expected by 1990 due to the increased employment at the mall (See fig. II-6). The increase would be less than the net employment increase due to the mall because some of the workers would already live in the Helena area. This growth represents less than 1 percent of Lewis and Clark County's projected 1990 population. This increased population is the basis for secondary impacts discussed in the fiscal impacts section.

Of this population increase, 68 would be school aged children. These children would represent about 1.5 percent of the projected enrollment of School District no. 1 from 1990-95. Forty-five students would be expected in kindergarten through the eighth grade and 23 in high school.

Based on a projected household size of 2.57 developed by the Areawide Planning Organization (A.P.O.), the additional population would add 118 households to the Helena area by 1990. Half of these households would likely locate within the city limits and the other half beyond the city limits (Western Analysis, 1980).

G. CULTURAL RESOURCES

No cultural, historical, or archeological resources are known to exist on the proposed site of Frontier Mall (see chapter II, Cultural Resources); therefore, no adverse impacts on those resources are expected. Undiscovered archeological artifacts may possibly exist beneath the surface of the site or hidden from view by vegetation; any such artifacts would likely be lost to scientific study during grading. Judging from the scarcity of such artifacts in the Helena Valley, there is no reason to suspect significant hidden resources on the 71 acres that would be disturbed.

H. RECREATION

1. Primary Impacts

Frontier Mall would increase the opportunity for shopping in Helena. The purpose of a shopping trip is not necessarily just that of purchasing a needed good. Shopping involves not only comparison of quality, style and price, but is also an avenue for socializing; for exposure to human experiences and entertainment (Gruen, 1973). "The concept of shopping as entertainment or as a pleasant, attractive activity has become important in designing shopping centers." (Woodward, 1978.) The use of entertainment has increased in recent years to attract customers to shopping centers. These customers window-shop and take advantage of activities the mall provides (Woodward, 1978).

The proposed mall would add some new restaurants to the area, although the type of establishments are not known. The developer plans to include a theater in the mall. A variance would have to be granted from the Airport Authority for this use. See chapter IV, Alternative Uses of the Mall Site.

2. Secondary Impacts

The increased population attributable to the mall would add slightly to the existing need to expand recreational facilities in Helena.

I. ESTHETICS

The adverse esthetic impact of Frontier Mall would be of minor significance because the mall site is not esthetically important compared to most undeveloped land surrounding Helena, and because the mall would probably be of more visually pleasing design than many of the warehouses and similar commercial developments along North Montana Avenue.

1. Mall Design

The mall would be a single large building about 1200 feet long and 600 feet wide at its widest point. The mall would be shaped like a row of boxes of different widths and heights joined side-by-side; this would break up the undesirable uniformity of a single long, rectangular structure. The architect's rendition of the mall shows vertical furrows on some of the exterior walls, which would further reduce uniformity of pattern.

As depicted by the company's artist, the mall would be tan and would be faced with stone or aggregate. The color would not contrast sharply with the predominant golds and tans of the grassy fields north and east of the mall. The mall would still attract visual attention because of its form and bulk.

The least attractive part of the mall, by most people's standards, would be the parking lot. The expanse of flat asphalt of uniform pattern and texture would not provide desirable visual contrast. Landscaping portions of the parking lot would help reduce the uniform expanse of paving.

According to the company's site plan, trees and shrubs would be planted along the outside of the mall; trees would be planted in islands in the northwest and southwest corners of the parking lot. The City of Helena will require the developers to plant 2 percent of the permanent parking area to trees and shrubs with a low profile. This landscaping would reduce visual impacts by breaking up the uniform expanse of flat asphalt.

Some of the old cottonwood trees northeast of the Montana-Custer intersection would probably be removed. Many of those trees are old, however, and have a limited life. The developer's site plan does not show what would happen to the cottonwood and spruce trees that line Montana Avenue north of the intersection; adverse visual impacts would be minimized by leaving as many of those trees as possible.

2. Area and Population Affected

It is not likely that people travel to the mall site to enjoy its view. The site's current esthetic quality is probably more often enjoyed by people driving by on other business. For that reason, the replacement of the current undeveloped land with an commercial uses would not be a significant loss. The mall would likely offend more people's esthetic sensibilities if it were sited, say, several miles from the nearest commercial development. Frontier Mall would introduce new forms, patterns, and colors to the site, but similar visual changes have already occurred in the commercial area immediately south of the site.

Most people would view the mall from Interstate I-15 north of the Custer Avenue overpass, from Custer between Montana Avenue and I-15, or from Montana north of the Custer intersection. The view from the interstate would not be greatly affected because the Helena urban area already forms the middleground view from the interstate. The relatively scenic view of trees, open fields, and distant mountains northeast of the Custer-Montana intersection would be replaced by a more urban scene. The mall building would become the dominant visual feature seen from Montana or Custer at or near their intersection.

Relatively few people would view the mall from residential areas. The mall would compromise the view south from a dozen or so homes along Beaverhead Drive. Seen from that area, the mall would stand out much more than the existing commercial area south of Custer Avenue, especially because the northeast corner of the mall would be 20 feet above the present ground level. With proper building design and landscaping, however, the mall would not have a significant adverse effect on those residents' view. No other residential areas would be within close visual range of the mall.

J. CLIMATE

Increased traffic and population due to the mall would not result in an increase in particulate emissions sufficient to have a measurable effect on the climate of the Helena Valley.

K. AIR QUALITY

1. Summary

The relatively small increases in pollutants due to the mall would have an adverse effect only on sensitive individuals remaining outside at the Montana-Custer intersection for extended periods.

Construction activities would cause a significant, but temporary, increase in pollutant emissions in the immediate area. The primary pollutant would be fugitive dust. Total pollutant emissions throughout the Helena Valley would not increase significantly. In 1980 and 1990, the proposed action would cause a 1-2 percent increase in pollutant emissions.

Significant impacts on air quality in the immediate vicinity of the Frontier Mall would occur in 1980. During peak traffic periods at the N. Montana-Custer intersection, CO, NO_x, and HC concentrations would increase by up to 40 percent; exhaust particulate and fugitive dust emissions would also increase significantly. During "worst case" conditions, CO concentrations at the downwind edge of the parking area would increase by up to 50 percent. By 1990, with the imposition of stringent emission controls and a decrease in trips to the mall, these impacts will decline considerably.

2. Construction Phase

During the construction of the Frontier Mall, there would be a temporary degradation of the ambient air quality. Fugitive dust from the 64-acre construction area would be the primary cause. Assuming a construction period of 15 months and one-half of the 64 acres continually disturbed, fugitive dust emissions would total about 576 tons (U.S. Environmental Protection Agency, 1975). Gaseous and particulate emissions from the equipment would total 145 tons. Nitrogen oxides (NO_x) would constitute over 50 percent (76.6 tons) of these emissions (table III-16). Any traffic queuing or slow-down on North Montana Avenue due to haul truck movement would also contribute to atmospheric pollutant loading, especially carbon monoxide. To what extent these emissions would increase ambient concentrations is not known.

TABLE III-16.--Frontier Mall construction emissions (tons)

[Source: U.S. EPA, 1976. Based on 1000 hours of use.]

Equipment Type and Number	CO	HC	NO_x	Aldehydes	SO_x	Particulate
D8 Cats (2)--------	.74	.23	5.0	.06	.35	.16
Graders (2)--------	.22	.05	1.05	.01	.09	.06
Dumptrucks (12)----	8.0	2.6	45.8	.67	2.7	1.5
Scrapers (2)-------	1.46	.63	6.2	.14	.46	.41
Loaders (2)--------	.55	.19	2.4	.04	.18	.17
Water truck (1)----	.67	.22	3.8	.05	.23	.13
Roller-packer (1)--	.09	.03	.52	.08	.03	.02
Paving trucks (2)--	1.3	.44	7.6	.11	.45	.26
Backhoe (1)--------	.19	.06	.74	.01	.07	.06
Foreman truck (2)--	.44	.13	.05	0	0	.01
Miscellaneous (3)--	.62	.24	3.4	.05	.21	.21
Total----------	14.3	4.8	76.6	1.2	4.8	3.0

3. Operation

a. Helena Valley

Total vehicle traffic and, therefore, pollutant emissions throughout the Helena Valley would increase slightly with operation of the mall (see Transportation). This analysis uses 1980 as the base year for projected pollutant increases. The actual projected opening is 1982, but the difference would not greatly change the analysis. Operation of the mall would not increase emissions of any pollutant more than 2 percent (table III-17; compare table II-14). In 1990, the increase in pollutant emissions throughout the Helena Valley as a result of the mall would also be minimal (table III-17).

b. Frontier Mall site

In 1980, during peak traffic flow at the North Montana-Custer intersection, maximum pollutant concentrations would increase significantly and would possibly exceed the 8-hour Federal ambient air quality standard (AAQS) for CO (9 ppm). Using the EPA methodology (U.S. Environmental Protection Agency, 1975), 8-hour CO concentrations could increase to 15 ppm (table III-18). The increased traffic would also cause increases in NO_x, HC, and particulate exhaust emissions plus increases in fugitive dust. Any buildup of pollutant concentrations at the intersection over a period greater than 2 days would be rare (see chapter II, Climate). As a result, harm to human health is not anticipated.

In 1990, with stringent Federal emissions standards, the pollutant concentrations would decrease. At the present time, it is not possible to quantify that decrease.

TABLE III-17.--Estimated emissions (tons/year) in the Helena area in 1980 and 1990 with the operation of Frontier Mall

[Source: on-file report, Department of Highways]

Source	Particulate		CO		HC		SO_x		NO_x		Fugitive Dust	
	1980	1990	1980	1990	1980	1990	1980	1990	1980	1990	1980	1990
Woodburning stoves	490	585	3,185	3,802	270	319	2.4	2.9	24	29	-	-
Automobiles	215	164	26,170	4,972	4,068	1,063	91.7	95.8	1,712	856	4,312	4,470
TOTAL	705	749	29,355	8,726	4,388	1,382	94.1	98.7	1,736	885	4,312	4,470
% Increase	0.4	0.4	1.3	0.9	1.3	1.2	1.3	2.2	1.4	1.6	0.7	1.9

TABLE III-18.--Estimated 1980 maximum pollutant concentrations (ppm) at the N. Montana-Custer intersection with the operation of Frontier Mall

[source: on-file report, Department of Highways]

Pollutant	1-hour maximum	8-hour maximum
CO	24.4	15
NO_x	1.3	0.8
HC	2.0	1.2

The CO concentrations at the downwind edge of the parking area during "worst case" 1- and 8-hour conditions would increase by 1 ppm and 0.6 ppm respectively. The EPA methodology (1975) used is available from the Montana Department of Highways. The estimated concentrations are similar to those predicted for other shopping centers (Tacoma City Planning Dept., 1976). In 1990 the maximum CO concentrations are expected to decrease.

The mall building itself would not produce pollutant emissions because no on-site incinerators are planned. Combustion of natural gas for heating would produce minor amounts of nitrogen oxides and carbon monoxide.

L. NOISE

Noise during construction of the mall would occasionally disturb people working indoors near the mall. Noise from traffic when the mall is in operation would not interfere with any indoor activity. No homes, offices buildings, or other uses where quiet is important are located close enough to the mall to be adversely affected during the daytime; disturbance of sleep might possibly occur if construction work continued well past normal working hours.

1. Construction Sound Levels

Construction of the proposed shopping center is considered similar to construction of a nonresidential building (U.S. Environmental Protection Agency, 1971) since no detailed construction schedules nor methods are yet available. The typical sound levels of each phase of the construction operation are shown in table III-19.

TABLE III-19.--Typical ranges of sound levels at a construction site in a suburban residential area

[Source: U.S. EPA, 1971]

	Sound Level (dB)	
	I	II
Ground clearing----	84	83
Excavation---------	89	71
Foundations--------	77	77
Erections----------	84	72
Finishing----------	89	74

I--All pertinent equipment present at site.

II--Minimum required equipment present at site.

Noise levels were calculated assuming a distance of 50 feet from the noisiest piece of equipment, 200 feet from all other equipment, and a residual sound level of 50 dB(A). Since it has been shown that sound levels decrease 6 dB(A) for every doubling of distance from discrete (point) sound sources (Gordon and others, 1971) and there are no family dwellings in close proximity to the proposed site, construction noise would rarely, if at all, impact the indoor environment of the neighborhood. If construction activities occur before or after normal working hours (8 a.m. to 6 p.m.) noise impacts would possibly cause some interference with indoor activities, especially sleep. Interference with outdoor activity and conversation would also occur. This impact would not extend for any great distance from the site and would be greater if construction work continued beyond normal working hours.

2. Operational Sound Levels

During normal operation of the shopping center, noise impacts to the surrounding area would be slight. The major sound source at the Frontier Mall site would be from increased vehicle operation within the parking area and on the adjacent streets. Utilizing Galloway's approximation of traffic noise and the linear decrease of 3 dB per doubling of distance from a line source (Gordon and others, 1971), sounds levels at the N. Montana-Custer intersection would not interfere with any indoor activity. Outdoor activity and conversation interference would only occur within 40 feet either side of the intersection and possibly along a 40-foot corridor either side of N. Montana for some distance. Intrusive noise from service vehicles (i.e. garbage and delivery trucks) may occasionally occur during early morning hours.

Increased sound levels from equipment directly associated with operation of the mall, air-conditioning for example, would not be be distinguishable from the residual sound level outside the mall perimeter.

M. GEOLOGY

1. Summary

The probability of an earthquake severe enough to damage the mall during the next 50 years is relatively low, though considerably greater than if it were built in most parts of Montana. The potential for structural damage and human injury in a major earthquake, if one occurred, indicates that a mall design in excess of minimum standards should be considered.

There is may be a considerable amount of gold in the alluvium underlying the mall site; however, the cost of extracting the gold may prohibit its recovery.

The mall site would not pose any significant structural or geomorphic problems.

2. Geomorphology and Topography

The Frontier Mall site has an approximate average slope of 1.5 percent to the northeast. The southwest corner of the mall site is about 38 feet higher than the northeast corner. In order to make a level base for the mall at an elevation of 3832 feet, the developers plan to haul 384,000 cubic yards of fill from a gravel pit immediately west of the mall site across Montana Avenue. Another 73,000 cubic yards of material would be redistributed on the mall site by grading. The building site plus 50 feet around the building's edge would need to be graded first so that building construction may begin early. This would require 175,000 cubic yards of the total amount of fill.

The impact on traffic flows from gravel trucks crossing Montana Avenue is discussed under the Transportation heading.

3. Earthquake Hazards

There is roughly one chance in six of a magnitude 7 earthquake during the next 50 years. This probability is higher than elsewhere in Montana outside the Intermountain seismic belt (see chapter II, Geology). Such an earthquake would probably cause some structural damage to the mall even if the mall conforms with the Earthquake Regulations in the Uniform Building Code of 1979. Falling masonry and broken glass could injure people if the mall were occupied.

A magnitude 7 earthquake would present a possibility of a major fire. Depending on the type of force exerted by the quake, gas or water lines could rupture. If the released gases ignited, the resulting fire would be difficult to control, especially if water lines also ruptured. The series of earthquakes that struck Helena in 1935 (magnitudes 6.0 and 6.25) did not break any underground pipes; however, the 1971 San Fernando Valley earthquake (magnitude 6.6) caused much higher ground acceleration and broke many underground pipes. Shopping malls are generally resistant to major fires; an earthquake that caused a fire at the mall would probably cause more serious fires elsewhere in Helena.

City of Helena staff recommend a loop water system which would provide a backup supply in case only one underground pipe broke; however, both pipes or the mall feeder pipe could break.

The 1935 Helena earthquakes caused extensive property damage and four deaths. The greatest damage was to buildings on alluvium, the material underlying the mall site. Building codes have become considerably more stringent since 1935, so Frontier Mall would have a good chance of withstanding an earthquake comparable to 1935's with little structural damage or risk to occupants. An earthquake of severity comparable to the 1935 episode is expected to occur, on the average, about every 70-100 years (see chapter II, Geology).

The developers of Frontier Mall could further minimize earthquake hazards by constructing the mall in excess of the 1979 Uniform Building Codes. Overhead glass skylights, windows, doors, and masonry walls could be designed and located to minimize the hazard to occupants.

Because the water table at part of the mall site is high, the Villy soils could liquify during an earthquake. The developer's engineering consultants propose to replace the Villy soils with more stable gravels under the foundation.

The City of Helena will review the developer's plans to determine if they meet the minimum requirements of the 1979 Uniform Building Codes. At that time the city or the county could require additional measures to minimize earthquake hazards.

4. Stratigraphy and Structure

Development of the mall would not adversely affect the stratigraphy or structure of the proposed mall site.

The mall site would be structurally stable so long as the unstable Villy soils are not used as foundation materials for the mall building or parking lot. The Villy soils are seasonally saturated by ground water and are also fairly fine textured; they would not adequately withstand large bearing forces. Developers Diversified's engineering consultant, Stahly Engineering and Associates (written commun., December 10, 1979) stated that unstable Villy soils would be excavated and replaced with gravelly material, with bearing strength adequate for foundation purposes.

5. Mineral Potential

The 71-acre parcel proposed for development could contain up to $12.5 million worth of gold at $500/ounce (see chapter II, Geology). Extracting this gold may not be economical at current prices. See chapter IV, Alternative Uses of the Mall Site.

N. HYDROLOGY

The proposed mall would not adversely affect surface water or ground water. Ground water would not be adversely affected because the mall would use city water and sewer systems.

The developer will be required to construct a drainageway which directs runoff around the mall site (see Appendix A). The drainage must be capable of carrying 410 cubic feet per second--the amount of runoff expected if the City of Helena'a Master Storm Drainage Plan were adopted (see chapter II, Hydrology).

The developer's engineering consultant has estimated that the increment of runoff and sediment generated by the mall would be adequately detained by an on-site detention pond slightly larger than 2 acre-feet. The City of Helena has required 12 acre-feet of storage (Appendix A), which would be sufficient to store runoff and sediment from the mall during a 50-year storm and would also compensate for the lost natural storage capacity of the depressions along the southern margin of the site. The pond would have to be periodically dredged out to maintain its storage capacity.

No provisions have been made to change the destination of runoff from the mall site--now the Helena Valley Canal (see chapter II, Hydrology).

O. SOILS AND VEGETATION

Of the 54 acres that will be disturbed during the grading operation, approximately 19 acres are to be landscaped and revegetated, utilizing a portion of the previously stockpiled topsoil. For the most part, no problems are anticipated regarding erosion or plant establishment, with the possible exception of the 3:1 slope area along the northeastern edge of the mall parking lot.

Using the Universal Soil Loss Equation (U.S. Environmental Protection Agency, 1977), the potential loss of soil due to erosion on this 3:1 slope area is approximately 25 tons/acre/year. This rate of soil erosion would have a detrimental effect on vegetation establishment and onsite surface water quality. The detention pond would capture any sediment produced, however. Erosion problems on these slopes could be drastically reduced by using a straw mulch soon after spreading the topsoil. Application of the mulch at a rate of 1 ton/acre would reduce the potential soil loss to approximately 5 tons/ acre/year, reducing the erosion rate by about 80%. This would result in a considerably higher success rate for vegetation establishment, and greatly reduce the adverse effect on onsite surface water quality.

P. WILDLIFE

The various small mammals, birds, and other small life forms that now use the site would be displaced to adjacent areas or would be lost; the loss would not be significant because nearby undeveloped parts of the Helena Valley probably contain the same animals in abundance. No rare, endangered, or threatened wildlife is known to use the mall site.

CHAPTER IV

ALTERNATIVES

A. ADMINISTRATIVE ALTERNATIVES AVAILABLE TO STATE AGENCIES

1. Department of Highways Approach Permit

Section 18-2.6AI (1)-5615 MAC provides that:

> (5) the Field Maintenance Bureau Personnel, in conjunction with the Division Traffic Engineer, are delegated authority to approve curb cuts, public and private approaches serving businesses, residences and agricultural uses in rural and urban areas without further consultation if the traffic conditions are not congested. In congested areas, usually in urban situations the Field Maintenance Personnel and Division Traffic Engineer can request the Manager, Traffic Design Unit, Helena, for further technical aid.

If the permit application can satisfactorily solve any potential traffic conflicts revealed in an engineering evaluation by the Department, the permit is approved. If not, the application is returned to the applicant for necessary modifications or denied.

2. Department of Health and Environmental Sciences' Review and Approval of Plans for Public Water and Sewer Systems

Section 16-2.14. (10)-S1432, ARM provides that:

> (2) Upon receipt of plans and specifications, the department shall notify the person within sixty (60) days if the material is satisfactory, and if not, what additional information is required.
>
> (3) If additional information is needed, no further processing will be made until all requested information is received.
>
> (4) If the plans are solely for the extension of the existing system, only such information as is necessary for the comprehension of the plans shall be required in the report. The comprehensive report and plans and specifications for a proposed water system shall be prepared in accordance with the format and criteria set forth in the Recommended Standards for Water Works prepared by the Great Lakes Upper Mississippi River Board of State Sanitary Engineers in 1974, or subsequent editions. The comprehensive report and plans and specifications for sewage systems shall be prepared in accordance with the format and criteria set forth in the 1971 Revised Version of the Recommended Standards for Sewage Works or subsequent editions.

> (6) To the extent practicable, a person shall avoid locating part or all of the new or expanded facility at a site which: (a) is subject to a significant risk from earthquakes, floods, fires, or other disasters which could cause a breakdown of the public water system or a portion thereof.

B. ADMINISTRATIVE ALTERNATIVES AVAILABLE TO LOCAL GOVERNMENTS

1. Helena City Commission

The City Commission has previously exercised its discretionary prerogatives in regard to decisions involving action on the proposed Frontier Mall development. A discussion of these administrative alternatives will therefore not be presented in this EIS.

2. Lewis and Clark County Board of Conservation

The Lewis and Clark County Conservation District, under Ordinance N.77-01, has required a soil erosion and sediment plan for the mall construction. The Conservation District previously granted a permit for rough grading, with a condition that before development begins, further updating and approval of the plans will be required under that permit. Section 9 of the Ordinance provides:

> The supervisors shall, within 30 days, review all plans submitted and approve any such plans that meet the supervisors' best management practices. When the plan submitted for approval is found to be inadequate, the supervisors shall notify the person in writing within said 30 day period of any approval of the plan.

C. TECHNOLOGICAL ALTERNATIVES

1. Alternative Uses of the Mall Site

a. Geology

An estimated 24,000 to 30,000 troy ounces of placer gold underlies the mall site. Recovering the gold may not be economically feasible due to its low concentration and unknown extent of occurrence (see chapter III, Geology). If mining the gold proved profitable, it might be possible to build the mall after dredging the gold. This would eliminate some of the adverse impacts of the mall. The 345,000 cubic yards of fill needed to level the mall site could be obtained from the mining deposits if the entire 71-acre mall site were mined and if the spoils swelled 25 percent. Fill would not have to be hauled across North Montana Avenue, eliminating the impact on traffic discussed in chapter III, Transportation, Fill Material Hauling Plan.

If the swell factor of the mining deposits were greater than 25 percent, as appears probable, the base level of the mall would possibly be raised enough to eliminate the need for a sewage lift station.

Mining the placer deposits would delay construction of the mall from 2 to 4 years. The delay could make construction of the mall unprofitable due to rising construction costs and possible location of other shopping centers in Helena. It also may not be possible to compact the dredge tailings enough to form a stable base for the mall, given the potential for earthquakes in the valley.

b. Soils and Vegetation

The mall site, although not now being grazed, could support 70 animal-unit-months (AUM's) of vegetation per year (see chapter II, Soils and Vegetation). Assuming good grazing management and a 10-month grazing period, the site could produce about 3,500 pounds of beef/year if the mall were not built.

c. Noise

Adoption of the Airport Noise Compatibility Plan as currently proposed would reduce the options available for development of land near the intersection of North Montana Avenue and Custer Avenue (see fig. IV-1). After the date of adoption of the ordinance the following land uses would be prohibited:

- Hospitals, convalescent homes, and related health care facilities which provide either permanent or temporary housing of patients.
- Multi-family rental housing intended primarily for the elderly.
- Schools, except schools directly associated with permitted land uses (such as the airport vocational-technical center).
- Libraries, except those directly associated with permitted schools.
- Theaters, and other indoor or outdoor facilities for the performing arts.

Any such facilities existing in the area prior to the date of adoption of the ordinance would be allowed to remain and to continue operations, but could be enlarged or added to only if the developer agreed not to hold the Airport Authority liable for noise-related damages stemming from normal and anticipated airport operations (Morrison-Maierle, 1979). The above listed uses could occur if a variance were obtained from the Airport Authority.

As currently proposed, Frontier Mall would have an indoor movie theater; this use would be the only one affected by the proposed airport noise ordinance.

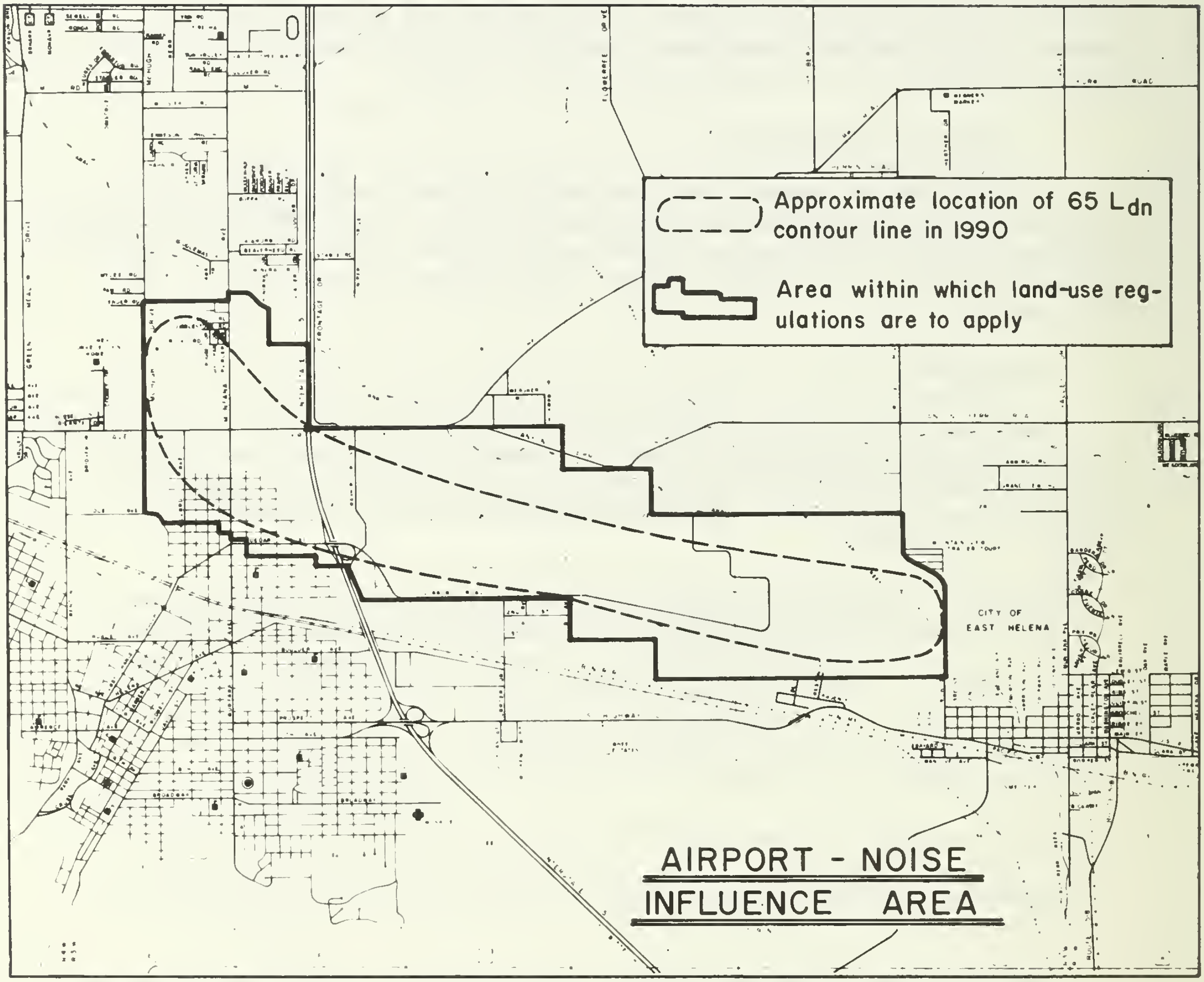
Approximate location of 65 Ldn contour line in 1990
Area within which land-use regulations are to apply
CITY OF EAST HELENA
AIRPORT - NOISE INFLUENCE AREA

FIGURE IV-1.--Helena Airport noise influence area.
Source: Morrison-Maierle, Inc., 1979.

2. Alternative Mall Designs

a. Expansion of the shopping mall

Developers Diversified has stated that they may add a fourth department store to Frontier Mall at some future date. This expansion, termed Phase II, would be allowed under the conditional use permit granted by the City of Helena on March 10, 1980.

Phase II would increase the gross leasable area of the mall by about 12 percent. This additional space would capture some of the projected growth of retail trade in the Helena area, which would delay or slow down the backfilling of vacant space in other parts of the city. The increased employment under Phase II would not result in a significant addition to the area's population.

b. On-site water source

There is probably sufficient ground water at the mall site for the developer to dig a well instead of using city water. However, the conditional use permit granted by the City of Helena requires the developer to use and pay for city-supplied water (Gus Byrom, Lewis and Clark County A.P.O., oral commun., March 20, 1980). See Appendix A for the list of conditions.

3. Mitigating Measures

The following measures could be imposed by the Department of Highways or by other regulatory authorities to reduce the environmental impacts identified in chapter III. Additional discussion is found in chapter III.

a. Noise

During construction, proper muffling and maintenance of all equipment, and restriction of its operation to normal working hours (8 a.m. to 6 p.m.) would reduce the increase in noise levels at the mall site.

After the mall is built, restricting service vehicle travel (garbage and delivery trucks) to normal working hours and nonresidential routes would reduce intrusive noise levels.

Screening of the mall area from adjacent areas by tree or shrub plantings could reduce the noise levels perceived in adjacent areas.

b. Air quality

During construction, complete-coverage watering of construction areas could reduce fugitive dust emissions by 288 tons--50 percent of the level projected in chapter III, Air Quality (U.S. Environmental Protection Agency, 1976). Proper maintenance and handling of construction equipment would reduce all pollutant emissions to some extent. Minimizing disruption of traffic flow (see chapter III, Transportation) would minimize gaseous exhaust emissions, especially carbon monoxide (CO).

During operation of the mall, proper design of entrances, exits, and parking spaces would reduce congestion (and therefore exhaust emissions) in the mall parking area. Regular cleaning of the parking area would probably aid in reducing fugitive dust emissions.

Upgrading the North Montana-Custer intersection would also reduce traffic congestion and exhaust emissions, especially CO. Mass transit and perhaps periodic street cleaning would also reduce fugitive dust and exhaust emissions.

c. Transportation

Disruption of traffic from hauling fill material across North Montana Avenue would be prevented by use of a conveyor belt to transport the fill above the road. The cost of a conveyor system compared to the proposed truck hauling system is not known. Gasoline consumption and diesel exhaust emissions would also be reduced because fewer trucks would be needed.

Provision of bicycle lanes, pedestrian walkways, and intersection crossings and signals would make the mall more accessible to people who do not use motor vehicles. Safety for those users would also be greater.

Even with the street and intersection improvements described in chapter III, Transportation, the level of service at and near the North Montana-Custer intersection would become congested by about the year 2000. The problem would be due more to the growing population in the Helena Valley than to Frontier Mall. Several long-range solutions are available, either singly or in combination:

- Expansion of North Montana Avenue to six lanes.
- Providing double left turn lanes from westbound Custer Avenue traffic onto Montana Avenue.
- Prohibition of left turns from Custer Avenue at the intersection.
- Provision for additional local street access near the mall.
- Construction of a new interstate interchange at Custer Avenue.

These improvements would improve traffic flows at the intersection but could cause undesirable effects elsewhere. For example, providing local street access to the mall could increase traffic in nearby residential areas.

d. Esthetics

Planting shrubs and small trees in islands in the mall parking lot would break up the uniform expanse of flat asphalt and provide for additional visual contrast. The plantings would probably have to be of low profile so as not to obstruct drivers' vision.

e. Geology

Construction of the mall in excess of the minimum building standards would help minimize potential damage and risk to occupants during a major earthquake. If concrete, stone, or aggregate is used for wall construction, it could be reinforced to withstand substantial earthquake stresses of 0.5 to 1.0 of gravity. Any skylights in the mall could be reinforced or made of a shatterproof material to prevent injury from falling glass.

CHAPTER V

CONSULTATION AND COORDINATION

A. DEVELOPMENT OF THIS STATEMENT

Information used to analyze Developers Diversified's proposed Frontier Mall was solicited from the following agencies and companies. All are located in Helena.

Federal Agencies:

U.S. Department of Agriculture:
   Forest Service
   Soil Conservation Service
U.S. Department of the Interior:
   Bureau of Mines
   Geological Survey
U.S. Environmental Protection Agency

State Agencies:

Department of Health and Environmental Sciences:
   Air Quality Bureau
Department of Community Affairs
Department of Fish, Wildlife, and Parks
Department of Highways
Department of Natural Resources and Conservation
Department of Revenue

Local Governments:

City of Helena
Lewis and Clark County Areawide Planning Organization

Companies:

Developers Diversified (through Robert M. Murdo)
Montana Automobile Dealers Association
Montana Power Company
Morrison-Maierle Inc., Consulting Engineers
Olson-Elliot & Associates, Consultants
Stahly Engineering & Associates
Western Analysis, Inc.

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B. REVIEW OF THIS STATEMENT

A preliminary version of this statement was reviewed by the Department of State Lands and the Department of Highways.

In accordance with the Department of Highways' regulations governing environmental impact statements (EIS's), copies of this draft EIS will be made available to the public for comments and suggestions. All comments received will be carefully considered in the preparation of a final EIS. Written comments should be addressed to Les Reichelt, Environmental Coordinator, Department of Highways, 2701 Prospect Avenue, Helena, MT 59601.

The draft EIS is available for review in the following places:

- Montana Department of Highways, 2701 Prospect Avenue, Helena, Montana.
- Lewis and Clark Library, 120 South Last Chance Mall.

A limited number of copies are available on request from the Department of Highways, 2701 Prospect Avenue, Helena, MT 59601.

CHAPTER VI

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CHAPTER VII

APPENDIXES

A. CONDITIONS FOR APPROVAL OF CONDITIONAL USE PERMIT FOR FRONTIER MALL (AS REVISED FROM ORGINAL CITY OF HELENA STAFF RECOMMENDATIONS)

[Source: Lewis and Clark Areawide Planning Organization]

1. Developer will be required to pay a $300/acre surcharge to the City prior to connection to existing sanitary sewer system.

2. On site sanitary sewer facilities will be constructed, operated and maintained by the developer. Construction will be in accordance with City standard specifications and approved by the City Engineer.

3. No building construction shall be allowed on the existing sanitary sewer main easement along the southern portion of the property.

4. A 12" water line will be constructed on Custer Avenue from Montana Avenue to I-15 right-of-way line. Also, the developer will agree to pay the cost of a 12" main along Montana Avenue from Custer Avenue to the north property line of the tract encompassing Frontier Mall, at such time that the City deems it necessary.

   Both of these improvements may be installed through SID financing, and should this be the case, the entire cost of the project will be assessed to the benefiting property. Should the SID fail for any reason, then the developer shall pay the entire cost of construction, and the City agrees to reimburse the developer the difference in cost of materials above 8", in accordance with City policy, when funds are available, but in no case later than ten (10) years from the date of construction of the lines. The developer may also recover the prorated share of its costs from any property utilizing the mains in accordance with City policy at the time the mains are completed.

   In addition to the above the developer shall pay the cost of construction of a 12" main on Montana Avenue from Poplar Street north to the 12" main installed under SID 342, and a 12" main across the Burlington Northern railroad tracks from Phoenix Avenue to Helena Avenue (all as recommended in "Water System Improvements Program and Master Plan for the City of Helena," dated April, 1978).

   The estimated cost of construction of this improvement shall be paid to the City of Helena in cash prior to the issuance of a building permit, and the amount of such payment shall be calculated as follows:

   The base construction cost shall be $155,000, which is estimated cost in March, 1979. This base cost to be adjusted from that date in accordance with The Construction Cost Index. In addition to the base cost the payment shall include the following:

  a. Design cost; $9,000, as per contract with Peccia & Associates.

  b. Construction Engineering; $6,000, as per contract with Peccia & Associates. (This cost is firm if construction is completed during calendar year 1980, beyond which this item will be subject to adjustment as per The Construction Cost Index.)

  c. Contract Adminstration - 5 percent of the adjusted construction cost.

  d. Quality Control Testing - 1 percent of adjusted construction cost.

5. Developer be required to pay the costs for 12" mains and appurtenances for the water lines along Custer from Montana Avenue to I-15 and Montana north of Custer with an agreement with the City for reimbursement for the material costs for the mains and appurtenances above 8", in accordance with City policy, when funds are available, but in no case later than ten (10) years from the date of the construction of the lines. Developer may also recover a prorated share of its costs from any property utilizing the mains in accordance with City policy in effect at the time the mains are completed. The City would approve the creation of an SID for these improvements; however, if the SID fails for any reasons, the developer will proceed as above.

6. The developer shall provide a drainage way through the site capable of handling 410 cfs. In addition the developer will detain, on site, 12 acre feet, such detention/retention facility to be approved by the City Engineer prior to construction.

7. Modify the signals at the intersection of Custer and Montana Avenue. A three phase signal system to replace the two phase system will be installed. (Estimated cost $40,000.) This project should not be completed and made operational until the actual impact of additional traffic is experienced. Funds in the amount of the estimated project should be escrowed with the City prior to the issuance of a building permit.

8. The developer will extend the acceleration and deceleration lanes and left turn lane mentioned in condition number 9 on Montana Avenue south to the intersection of Custer and Montana, thus providing four lanes of traffic for this portion of Montana Avenue. The developer will also provide an additional right turn lane at the northwest corner of Custer and Montana and provide a left turn lane, and a right-turn through lane at the northeast corner of Custer and Montana.

9. The developer shall provide acceleration and deceleration and left turn lanes at the access point of Montana Avenue and

at the west access point on Custer Avenue. The developer shall provide acceleration and deceleration lanes at the east access point on Custer Avenue.

10. Access permits shall be obtained by the developer from the Montana Department of Highways.

11. The developer must design and implement a vehicular off-street parking and internal circulation plan and pedestrian/bikeway plan for Frontier Mall which meets with the approval of the City Public Services Director.

12. The landscaping plan must meet with approval of the Public Services Director and be in accordance with City Ordinances which require that a minumum of 2 percent of the gross required parking area be in landscaping.

13. The developer shall provide a signing proposal which meets with approval of the Public Services Director.

14. No building permit is to be issued until all of the above conditions have been fulfilled or a bond has been posted in accordance with Sec. 11-15-3 of the City Ordinances.

15. According to City policy, a building permit must be applied for within one year from date of conditional use permit approval.

16. The conditional use permit is subject to annexation to the City and zoning to B-2 Community Highway Business District.

APPENDIX B.--Personal income by major sources, Lewis and Clark County, 1972-1977 (thousands of dollars)

[Source: U.S. Department of Commerce, 1979a]

	1972[a]	1973[a]	1974[a]	1975[b]	1976[b]	1977[b]
Total Labor and Proprietors Income By Place of Work[c]						
By Type						
Wage and salary disbursements	109,544	120,467	132,422	151,322	167,723	193,461
Other labor income	6,859	7,777	9,090	11,981	14,696	17,802
Proprietors income[d]	16,861	21,029	14,784	15,605	15,176	17,613
Farm	3,856	4,591	-19	722	-295	-245
Non-farm[d]	13,005	16,438	14,803	14,883	15,471	17,858
By Industry						
Farm	5,091	6,055	1,759	2,353	1,145	1,060
Non-Farm	128,173	143,218	154,537	176,555	196,450	227,816
Private	83,728	94,497	99,674	112,360	132,478	154,628
Ag. Serv., For., Fish., and other[e]	134	(D)	(D)	159	197	217
Mining	(L)	(D)	(D)	332	415	192
Construction	8,436	10,411	10,067	9,068	12,484	16,230
Manufacturing	9,486	10,639	12,232	13,891	15,447	17,858
Non-durable goods	3,081	3,508	4,199	4,243	4,920	5,547
Durable goods	6,405	7,131	8,033	9,648	10,527	12,311
Transportation and public utilities	13,178	14,436	16,742	20,479	24,278	29,307
Wholesale trade	4,366	5,123	5,000	7,261	9,669	10,435
Retail trade	13,920	15,869	16,589	17,381	20,089	23,871
Finance, Insurance, and Real Estate	9,538	10,103	10,190	11,565	13,714	15,658
Services	24,675	27,767	28,552	32,224	36,185	40,860
Government and Government Enterprises	44,445	48,721	54,863	64,195	63,972	73,188
Federal, Civilian	14,252	15,129	16,638	19,377	16,279	21,154
Federal, Military	592	636	664	713	776	778
State and Local	29,601	32,956	37,561	44,105	46,917	51,256
Derivation of Personal Income By Place of Residence						
Total labor and proprietors income by place of work, less:	133,264	149,273	156,296	178,908	197,595	228,876
Personal contributions for social insurance by place of work	6,936	8,402	9,240	10,937	12,072	13,968
Net labor and proprietors income by place of work, plus:	126,326	140,871	147,056	167,971	185,523	214,908
Residence adjustment	-1,371	-1,421	-1,712	-2,089	-2,481	-2,
Net labor and proprietors income by residence	124,957	139,450	145,344	165,882	183,042	211,981
Plus: Dividends, Interest, and Rent[f]	18,646	21,979	26,813	29,516	31,836	35,540
Plus: Transfer payments	18,593	21,513	25,316	30,706	33,974	37,732
Personal income by place of residence	162,196	182,942	197,473	226,104	248,852	285,253

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[a] Estimates based on 1967 SIC.

[b] Estimates based on 1972 SIC.

[c] Consists of wage and salary disbursements, other labor income, and proprietors' income. Primary source for private non-farm wages: ES-202 covered wages--Montana Employment Security Commission.

[d] Includes the capital consumption adjustment for non-farm proprietors.

[e] Includes wage and salaries of U.S. residents working for international organizations.

[f] Includes the capital consumption adjustment for rental income of persons.

(D) Not shown to avoid disclosure of confidential information, data are included in totals.
(L) Less than $50,000, data are included in totals.

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